the OIL AND GAS JOURNAL

The Right Bits When You Need Them!

It's no accident that your local Hughes field representative delivers the *right rock bits on your rig at the right time!*

The effort of the entire Hughes organization is directed toward knowing, in advance, the bit requirements of each field, in order to set up manufacturing schedules to meet those requirements.

This means knowing the types and sizes of bits needed and approximately when they will be required, based on the casing sizes in general use and likely to be used...formations being encountered ...bits making the best footage...and the depth and number of wells to be drilled.

This information comes from many sources. Its accuracy is made possible by the co-operation of every segment of the drilling and producing industry and accounts for the fact that the Hughes Tool Company is able to anticipate the bit needs of the industry.

HUGHES Tri-Cone ROCK BITS

PRICE 50 CENTS TABLE OF CONTENTS PAGE 63 DECEMBER 6, 1951

Greetings

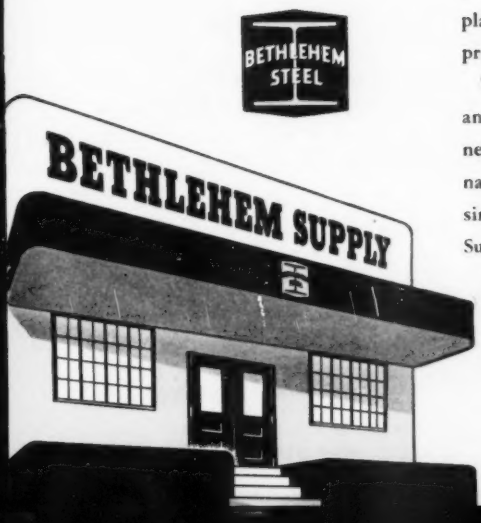
—from Halliburton

Stocked to Serve Your Local Needs

Each of the Bethlehem Supply stores is stocked with the items required in the region it serves.

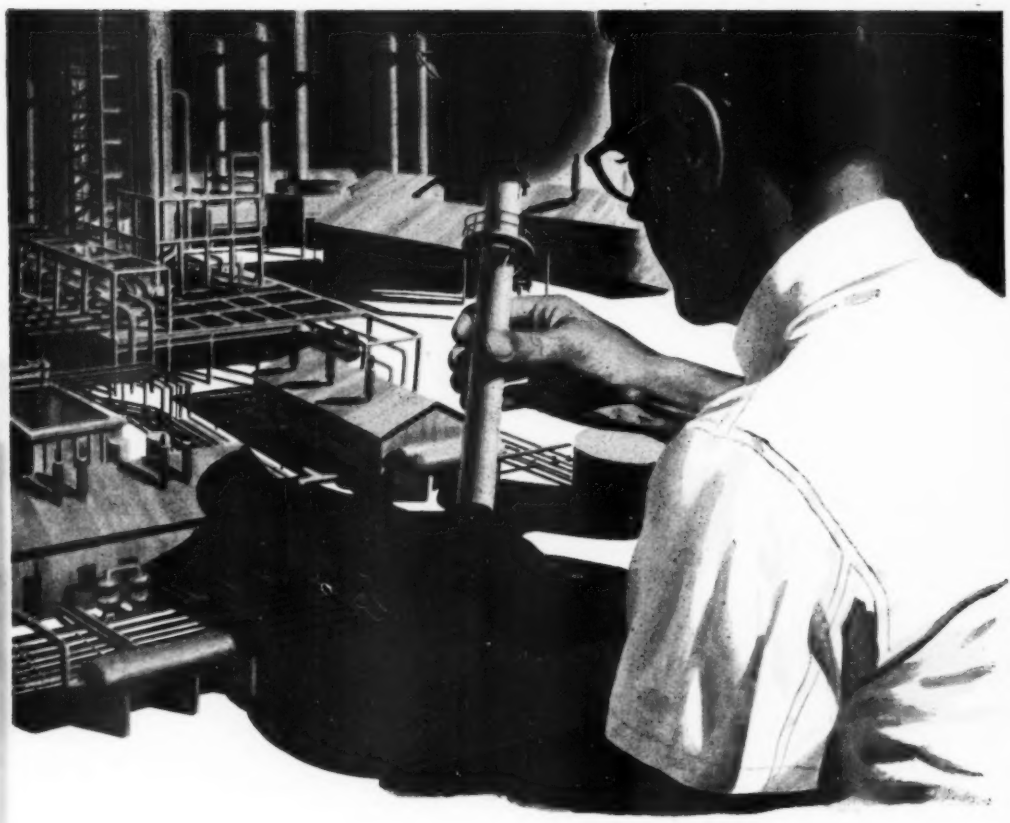
This means that in a refinery center, the Bethlehem store carries supplies normally needed for refinery maintenance and construction work. Stocks meeting local requirements are also carried in areas having natural gasoline plants, petro-chemical plants, oil pipe lines, gas-transmission lines, and oil-producing properties.

When looking for valves, welding fittings and flanges, studs and nuts, hose and packing, tools, gages, or other quickly-needed items, call our nearest store. If in the market for furnaces, pumps, or allied types of products, you will find we can simplify the job of selection. This is one of the many Bethlehem Supply services that will prove helpful to you.



BETHLEHEM SUPPLY COMPANY

General Offices: 21 E. Second St., Tulsa, Okla.
West Coast Headquarters: Los Angeles, Calif.
Export Distributor: Bethlehem Steel Export Corporation



BROWN & ROOT fills prescriptions... for industry

Whatever the nature of your project, be it pipe line, petroleum plant, chemical plant, or public utility, Brown & Root's tremendous backlog of experience can serve you well.

A glance at the record shows that the biggest names in industry have utilized Brown & Root's services time and again. This fact is a graphic demonstration of the statement, "The Brown-Bilt trade-mark is synonymous with job-well-done."

If your firm contemplates construction or expansion now or in the near future, a call from you will put Brown & Root plant-planning experts at your disposal.

BROWN-BILT

BROWN & ROOT, Inc. *Engineers - Constructors*

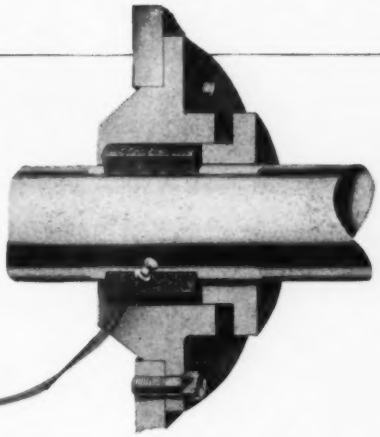
P. O. BOX 3, HOUSTON 1, TEXAS

CABLE ADDRESS — BROWNBILT

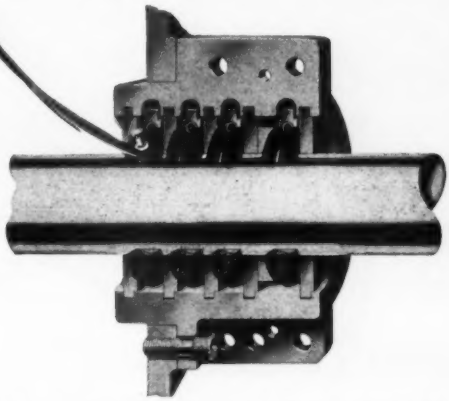
Associate Companies — BROWN ENGINEERING CORP. • BROWN & ROOT MARINE OPERATORS INC.

COPPUS TURBINES

offer you a choice of packing rings



STANDARD METALLIC RING PACKING — Made of high grade asbestos cores encased in specially treated lubricated aluminum foil. Recommended as a low-friction, long-service packing for steam temperatures up to 850 F and back pressures up to 50 lb. Adjustable packing glands keep leakage at minimum. Easy access to packing rings.



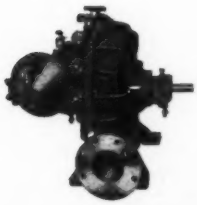
OPTIONAL CARBON RING PACKING — Consists of three carbon packing rings on the pressure side and one beyond the leak-off section. Each ring has three segments held together by a stainless steel garter spring. For back pressures up to 75 lb. Standard for vacuum or gas operation, or when leak-off is desired.

Heavy chrome plating on shaft at stuffing box is common to both types of Coppus packing.

Coppus Turbines ranging from 150 hp down to fractional in 6 frame sizes

FIT TURBINE COSTS TO HORSEPOWER NEEDS

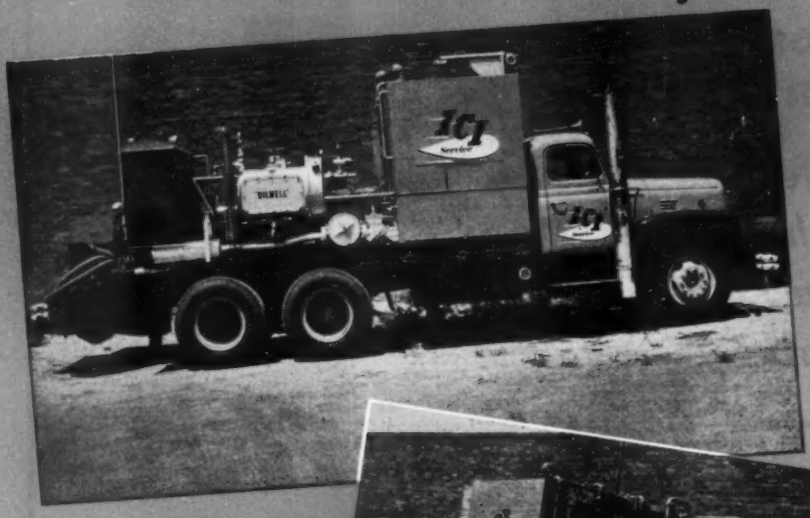
When you buy turbines rated close to your exact horsepower needs, you save plenty of money. That's because turbines are generally priced in proportion to their size. The wide range of sizes of Coppus Turbines promises purchasing economy for you from the 150 hp size down to the smallest. As for operating and maintenance economies, you get them, too, from such other features as: greater number of manually operated valves for individual control of steam nozzles; replaceable cartridge-type bearing housings and others. For complete details . . .

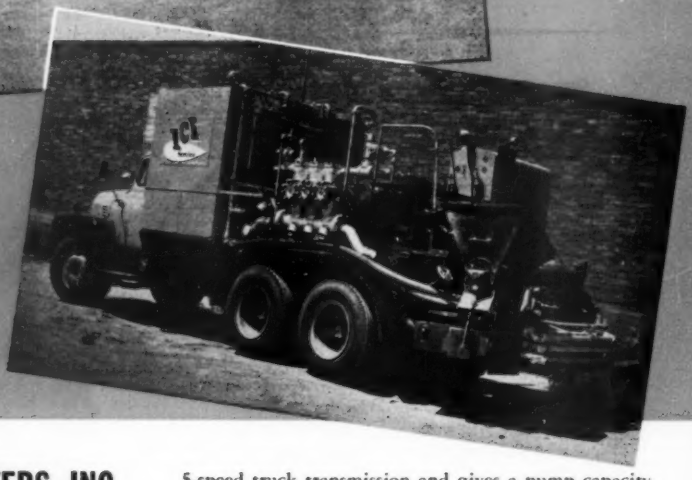


WRITE FOR BULLETIN 135
COPPUS ENGINEERING CORPORATION
273 Park Avenue
Worcester 2, Mass.
Sales offices in
THOMAS' REGISTER

COPPUS "BLUE RIBBON" TURBINES

"Oilwell" No. 48P-HD Plunger Pumps





the Strong HEART for your Acidizing and Cementing Units

INTERNATIONAL CEMENTERS, INC. prefer 48P-HD's for their 108-T Units

because . . . they provide maximum pressure with good volumetric capacity and are designed specifically to give outstanding performance at minimum operating and maintenance costs. "Oilwell" No. 48P-HD Triplex Plunger Pumps are extremely compact for truck mounting (7′ 3¼″ long—3′ 9⅝″ wide) and light in weight (5,700 lbs.) for their wide pressure-capacity range. With 4½-inch plungers these pumps are designed for services with maximum stalling pressure of 10,000 psi.

"108- T." I. C. I. Units . . . are so designed that power from the truck engine and from an auxiliary deck-mounted engine can be used separately or synchronized by gearing to drive the pump.

Truck-engine power on these International Units is transmitted through a power take-off from the main 5-speed truck transmission and gives a pump capacity range from 18.5 GPM at 8,000 psi to 265 GPM at 600 psi.

Their pump operating range from the auxiliary engine is from 18.5 GPM at 4,500 psi to 165 GPM at 475 psi.

By utilizing power from both sources even greater ranges can be achieved.

Bring . . . your special-application oilfield-pump problems to "Oilwell" . . . for tailored-for-the-job engineering. "Oilwell" sales representatives everywhere, will gladly help you GET THE FACTS.

OIL WELL SUPPLY COMPANY

Branches Serving All Oil Fields

Executive Office — DALLAS, TEXAS
Export Division Office —
30 ROCKEFELLER PLAZA
NEW YORK 20, N. Y.

Division Offices — CALGARY, CANADA
CASPER, WYOMING . . . COLUMBUS, O.
DALLAS, TEXAS . . . HOUSTON, TEXAS
TULSA, OKLA. . . . LOS ANGELES, CALIF.

USS "OILWELL" TRADE MARK

UNITED STATES STEEL

TRACKSON
PIPE LAYERS
THE PICK OF THE PIPELINERS!

From stringing to lowering in . . . on big new lines or salvage jobs . . . wherever Pipe Liners work, Trackson PIPE LAYERS are on hand—the first choice of the industry!

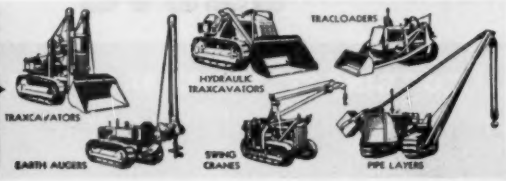
Trackson PIPE LAYERS on "Caterpillar" Diesel Tractors are the pick of Pipe Liners—chosen for their dependability . . . for their positive, safe control of the heavy lifts . . . for their fast operation . . . for their rugged durability that keeps them working long after others have been scrapped.

Make sure your spreads are equipped with the top choice for profit—Trackson PIPE LAYERS! Let your TRACKSON-CATERPILLAR Dealer help you plan your work fleet—now. He's at your service . . . or write TRACKSON COMPANY, Dept. OG-121, Milwaukee 1, Wisconsin.

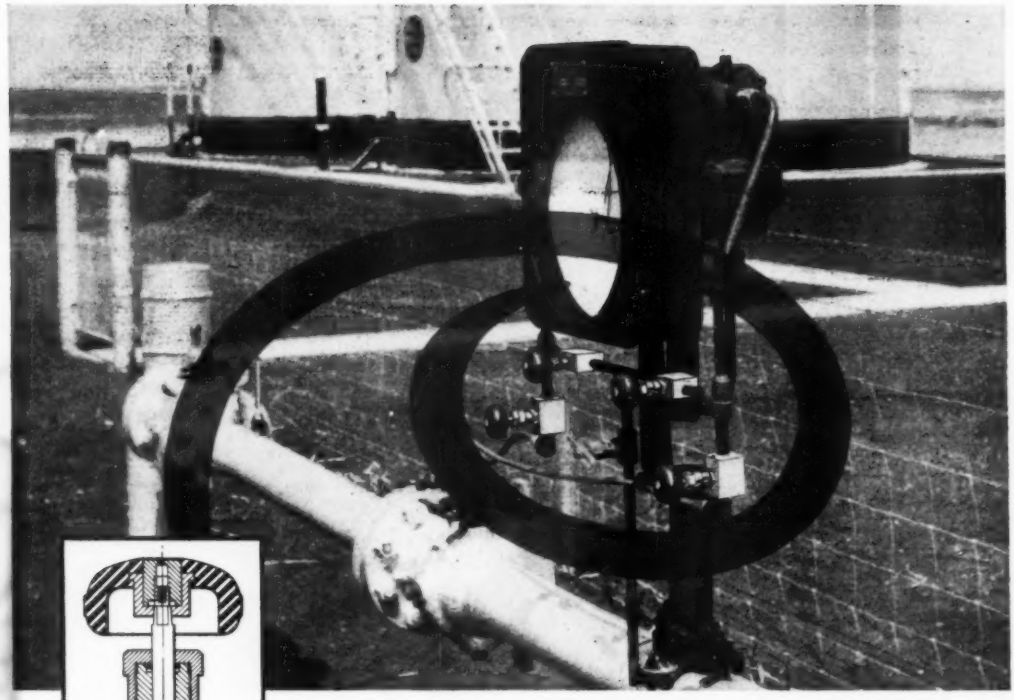
Two PIPE LAYERS tear out pipe on salvage operation avoiding serious delay on defense project.

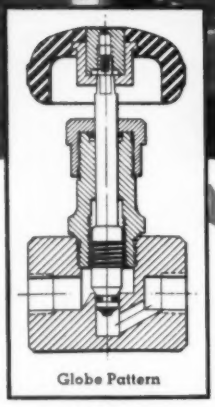
These MD8 PIPE LAYERS have the lifting capacity and precise control necessary for smooth lowering-in.

TRACKSON
TRACTOR EQUIPMENT



The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910. at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1951.





Globe Pattern

GROVE
"O" RING "T" SERIES
SEAT-SEAL VALVE

Stainless Steel Body
Bakelite Hand-wheel
Sizes: ¼", ⅜", ½"
Pressure Range: to 3000 p.s.i.
Temperature Range: —30° to 180° F.
4 Designs: Globe, Angle, Tri-port, Cross-over

SAVE VALUABLE TIME ON CHART CHANGES

Speedy valve operation is but one of the advantages you gain with Grove "T" Series Seat-Seal Valves on orifice meter manifolds. Grove's unique design increases valve life, reduces maintenance costs, assures perfect seating every time.

The reason is Grove's patented "O" Ring Seat-Seal principle. Ordinary hand pressure easily opens and closes the valve with positive, bubble-tight shut-off. Wrenches are never required. With line pressure increasing the sealing force, dirt and other foreign matter have no effect. Wire drawing and seat cutting are impossible.

Precision-built Grove "T" Series Seat-Seal Valves are designed primarily for meter manifolds, gauge lines and other similar service. Wire or write today for full details.

GROVE

The reliability of Grove Valves and Regulators is proved by the thousands of successful installations handling air, gas, oil, water and other fluids. For the solution to your control problems, contact the nearest Grove representative.

"O" RING "T" SERIES SEAT-SEAL VALVES

GROVE REGULATOR CO. 900 and HOLLIS STREETS, EMERYVILLE, CALIFORNIA
1801 CULLUM, HOUSTON 4, TEXAS • 105 EAST 60TH ST., NEW YORK 21, N. Y.
AGENCY OFFICES: Dallas, Corpus Christi, Odessa, Texas — Lafayette, Louisiana — Tulsa, Oklahoma — Los Angeles, California

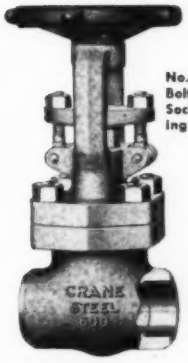
why CRANE 600-pound small steel gates are sure to meet your needs

You can't top these Crane Small Steel Gates for dependable performance on high pressure, high temperature lines . . . for ease of operation . . . for simplified maintenance. That's because they include design features normally found only in larger or more expensive valves.

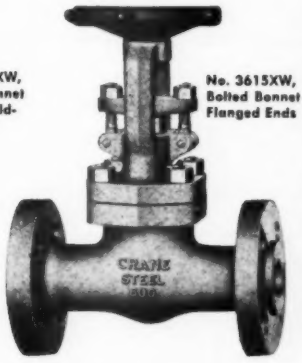
Then too, these Crane valves are available in a choice of types to meet your particular requirements. For example, with union or bolted bonnets; with screwed, flanged, or socket-welding ends; and in trim materials recommended for all common fluids.

GET NEW DESCRIPTIVE CIRCULAR AD-1881

For complete information—including prices—about these longer lasting, easier operating Crane Small Steel Gate Valves. Ask your Crane Representative for your copy, or write direct. No obligation.



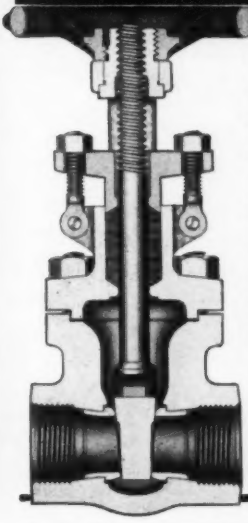
No. 3611XW, Bolted Bonnet Socket-Welding Ends



No. 3615XW, Bolted Bonnet Flanged Ends

UNION BONNET GATE. Screwed ends. Sizes: ¼ to 2-inch. Available in three different trim materials for a wide range of services. Also with socket welding ends

Easy to Operate... Easy to Service



EASY ACCESS to stuffing box assured by swinging gland eyebolts. Improved yoke design provides liberal working space.

DEEP STUFFING BOX filled with high quality asbestos packing rings maintains tight stem seal.

LEAKPROOF BONNET JOINT. Soft iron gasket in male and female joint cannot blow out.

T-HEAD DISC-STEM connection provides flexibility for smooth operation; prevents stem distortion or binding of parts.

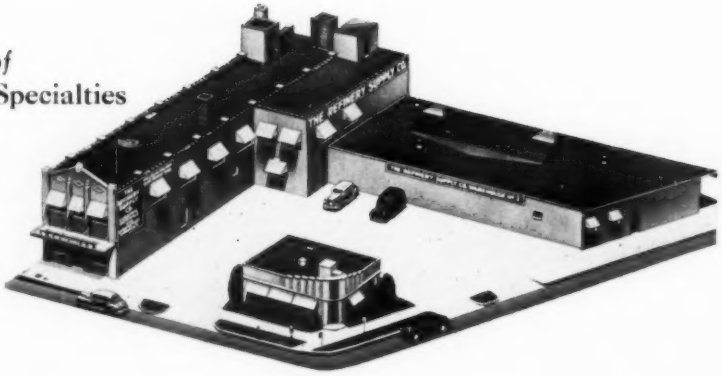
Cross-section No. 3607XW, Bolted Bonnet Gate, Screwed

CRANE CO.

General Offices:
836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

Home of
R.S. and Ac-Me Specialties



We are happy to announce the Re-Opening of our Houston, Texas, Branch

To better serve an important oil and gas area—we are Re-Opening our Houston, Texas, Branch. This will mean faster and more efficient service for companies operating in that area. You can depend on the same quality products that have made Refinery Supply Company outstanding in the petroleum industry. Our R.S. Oil & Gas Testing Specialties PLUS our exclusive distributorship of Central Scientific Company Products have made us leaders in our field . . . and now you can look forward to an even better service . . .

* *Remember — the Houston address is 2215 McKinney Avenue, Phone Preston 8921*

CENTRAL SCIENTIFIC COMPANY
CHICAGO

R.S.C. TULSA

REFINERY SUPPLY COMPANY CENCO

Laboratory Apparatus and Supplies *Oil and Gas Testing Equipment*

621-23 E. 4th St. Tulsa 3, Oklahoma

MURPHY DIESEL'S *Quick responsiveness pays off* when making hole

ONE of the most important characteristics of a really good drilling engine is its ability to take hold of a load and hold on without missing a beat . . . and that's just the characteristic of Murphy Diesels that so many drillers praise. Grant Hill, a driller on the Murphy powered Merline Drilling Company rig illustrated above says these Murphy Diesels are the most responsive power he's ever operated.

Murphy's quick responsiveness to load changes is the result of an integral hydraulic servo-type governor and other design features all of which are described in the informative booklet "*10 Questions to Ask a Diesel Engine Salesman*". Ask your Murphy Diesel Dealer for a copy or write direct.

MURPHY DIESEL COMPANY
5305 W. Burnham St.
Milwaukee 14, Wisconsin

OIL INDUSTRY FACTORY BRANCH
Sales, Parts and Service:
113-117 South Elwood Street,
Tulsa, Oklahoma

MURPHY DIESEL

Heavy duty power **for the oilfields**

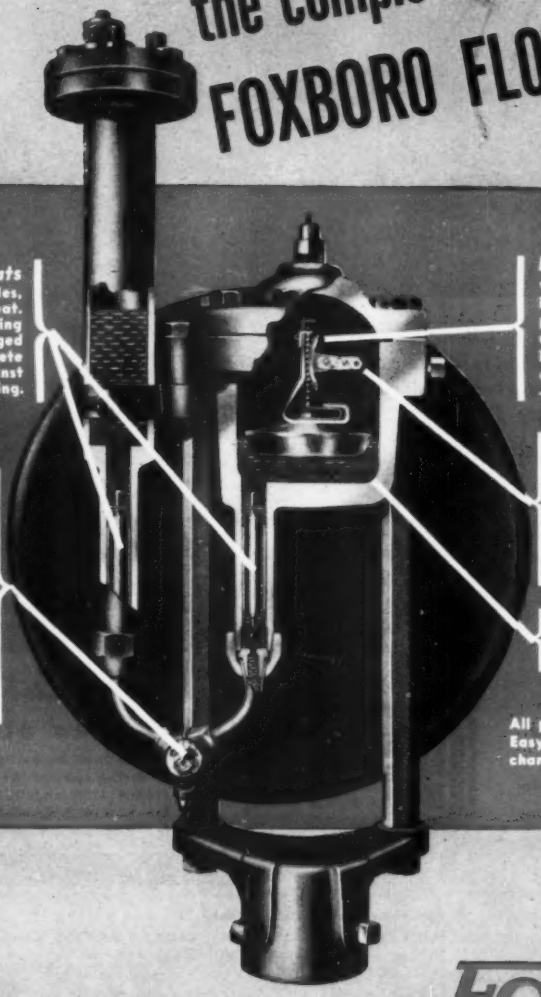
Murphy Diesel Engines and Power Units for drilling and pipe line pumping, 90 to 226 H.P., 1200 and 1400 RPM. Generator Sets, 60 to 140 K.W. Dual-Fuel Engines, 135 to 180 H.P. Also Crude Oil Burning Engines.

See Your Murphy Diesel Dealer

LOS ANGELES, CALIFORNIA Engine Sales & Service	EVANSVILLE, INDIANA Pershing Equipment Co.	EDMONTON, ALBERTA, CANADA Northern Engine & Equip. Co., Ltd.	DALLAS & LUBBOCK, TEXAS Conley-Lott-Nichols Mach. Co.	MT. VERNON, ILLINOIS Ed. Meyer Tractor Co.
SAN ANTONIO, TEXAS J. E. Ingram Equipment Co.	AMARILLO, TEXAS Service & Supply	JACKSON, MICHIGAN Utility & Industrial Supply	HOUSTON, TEXAS Houston Engine & Pump Co., Inc.	GREAT BEND, KANSAS Manufacturers Dist. Co.

ANNOUNCING

New Basic Advances in the complete line of FOXBORO FLOW METERS!



NEW Check Floats with redesigned guides, ball plug and seat. Insure perfect seating every time! Submerged in mercury for complete protection against frosting and fouling.

NEW U-Bend and Damping Plug Assembly. Easy to make up tight every time because of self-aligning all-welded construction. No gasket needed. Replaceable seats. Damping plug fully adjustable under pressure. Directed drain for mercury at lowest point.

NEW Segmental Drive Assembly with stainless steel ball chain that insures free travel of float, and with positive collet-type bearing shaft clamp. Assembly also available in Type 28 Meters with complete ambient temperature compensation —an exclusive new Foxboro feature.

NEW Pressure-Seal Bearing. Revolutionary ring seal gives unequalled freedom from friction, and complete freedom from leaks, at any working pressure. Factory-lubricated—no lubricator required. Shaft and bearing *both* of Type 316 stainless steel.

NEW Compact Float Chamber gives greater accessibility for easier, quicker cleaning.

All parts freely interchangeable. Easy substitution of range chambers.

FOXBORO.

REG. U. S. PAT. OFF.

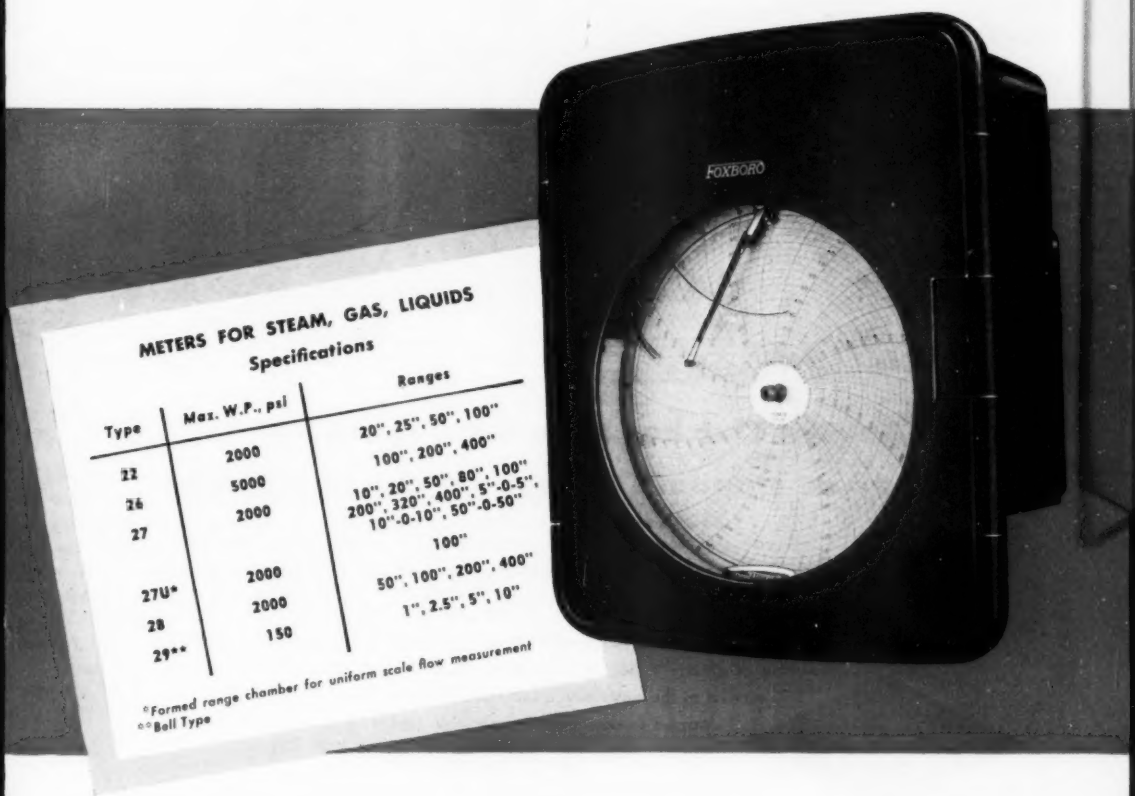
FACTORIES, IN THE UNITED STATES, CANADA AND ENGLAND

Higher sustained accuracy, less maintenance than ever before!

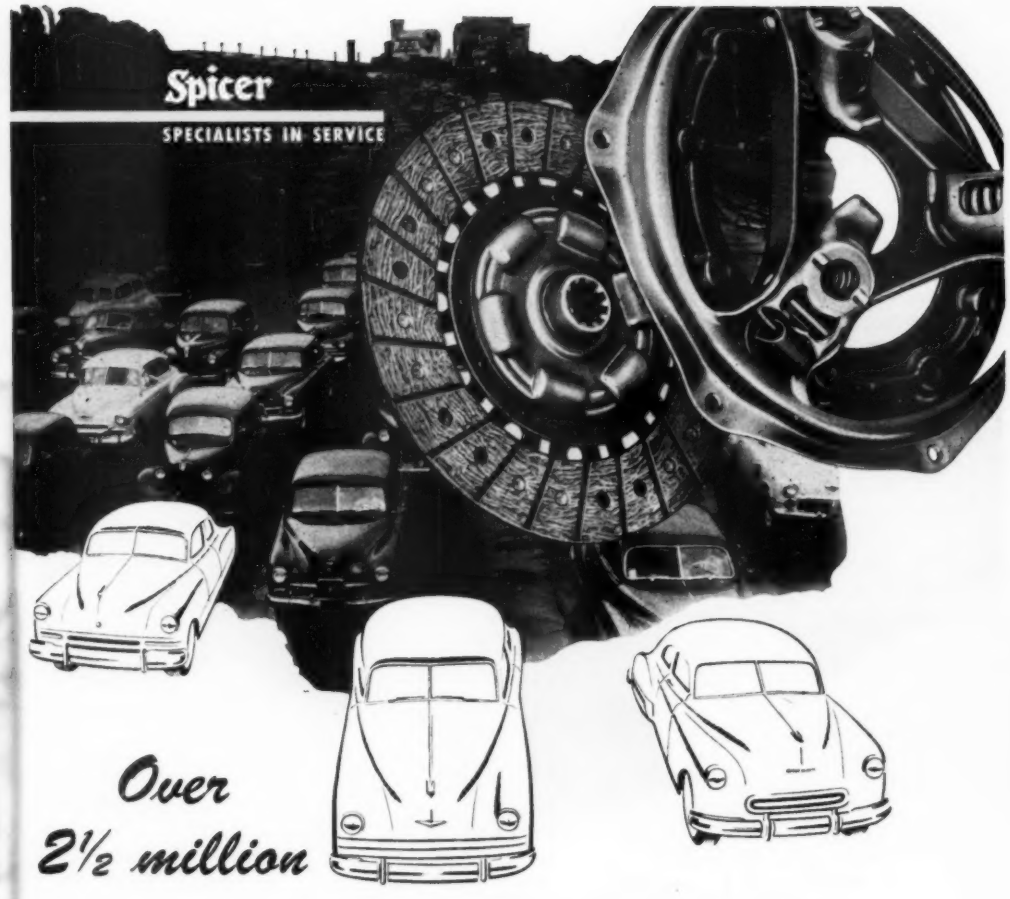
Outstanding improvements in every basic detail of differential meter design now afford a new complete line of Foxboro Flow Meters that set an unprecedented standard of dependable accuracy.

In addition to the important features outlined on the opposite page, these new meters retain all the uniquely advantageous features of the previous Foxboro line, including large floats with long travel for added power; and floats located in high pressure chamber to minimize ambient temperature effects. The combined result is practical metering performance that's farther ahead of the field than ever before . . . in maintenance-freedom as well as sustained accuracy.

Check up on all the advantages of the new Foxboro Flow Meters. Available in round or rectangular cases . . . as indicators, recorders, controllers or transmitters . . . with or without integrators. There's a type for every metering problem. Write for New Bulletin 460. **The Foxboro Company, 6012 Neponset Ave., Foxboro, Mass., U.S.A.**



. . . First in FLOW METERS



Auburn Clutches have been specified as standard passenger car equipment

The modern, exclusive Auburn design, the fine materials, and the expert workmanship in these widely-used units meet and exceed the most exacting requirements of automotive engineers.

Spicer-built Auburn Clutches embody all the engineering genius and manufacturing efficiency which Spicer has acquired in 47 years of continuous service to the automotive industry. Look to Auburn Clutches for the utmost in dependable operation and economical maintenance.

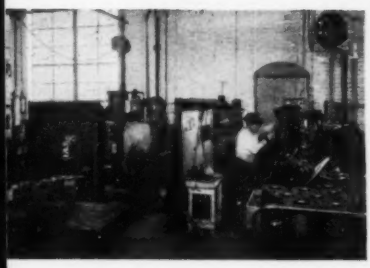
47 YEARS OF Spicer SERVICE

SPICER MANUFACTURING

Division of Dana Corporation • **TOLEDO 1, OHIO**

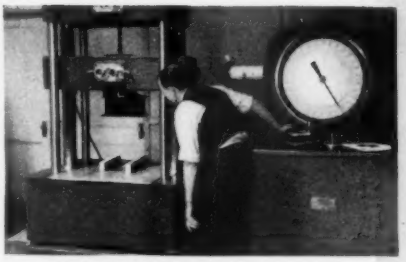
TRANSMISSIONS • UNIVERSAL JOINTS • BROWN-LIPE AND AUBURN CLUTCHES • FORGINGS • PASSENGER CAR AXLES • STAMPINGS • SPICER "BROWN-LIPE" GEAR BOXES • PARISH FRAMES • TORQUE CONVERTERS • POWER TAKE-OFFS • POWER TAKE-OFF JOINTS • RAIL CAR DRIVES • RAILWAY GENERATOR DRIVES

Why Grinnell is America's #1 Supplier of PIPE HANGERS *and* SUPPORTS



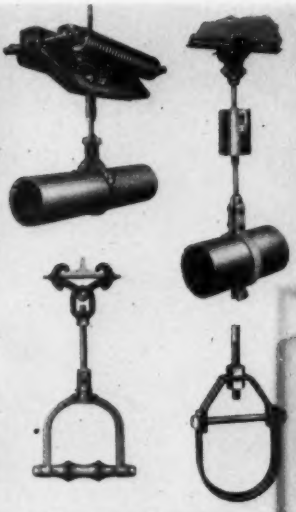
GRINNELL, ALONE, MANUFACTURES A FULL LINE OF HANGERS AND SUPPORTS

No other company, anywhere, makes a line as complete or varied. Grinnell produces hangers in thousands of combinations to support any piping.



GRINNELL, ALONE, MAINTAINS AN EXPERIENCED LABORATORY STAFF OF TRAINED TECHNICIANS

In its modern, well-equipped laboratory, tests are constantly being made to discover better ways of solving old and new pipe suspension problems.



Grinnell makes scientifically designed, ruggedly built pipe hangers and supports for every type installation.

GRINNELL, ALONE, PROVIDES ENGINEERING ASSISTANCE IN DESIGN AND INSTALLATION

Grinnell makes available specialized knowledge in the computation of hanger loads and the selection of the correct supports. Engineers in the field assist with problems in erection of pipe hangers.

GRINNELL, ALONE, THROUGH ITS CONVENIENT WAREHOUSES CAN SUPPLY YOU "OUT OF STOCK"

No manufacturer of pipe hangers offers a distribution system as thorough or efficient. Grinnell warehouses are located in 30 principal cities . . . with jobbers in practically every city, coast to coast.

Pipe suspension presents an extremely wide range of problems involving weights, stress, thermal movement, materials and specialized engineering. No one "goes into" the pipe hanger business overnight. Large manufacturing facilities, skilled technicians, and a lot of down-to-earth practical experience are needed.

Grinnell has become America's No. 1 supplier of pipe hangers and supports only because Grinnell has specialized in piping for one hundred years. Grinnell has developed a line of pipe hangers and supports for every piping requirement, from the simplest to the most complex.

Grinnell is always ready to co-operate with engineers and architects in the preparation of pipe suspension specifications.

Call Grinnell for any and all types of pipe hangers and supports.

GRINNELL

WHENEVER PIPING IS INVOLVED

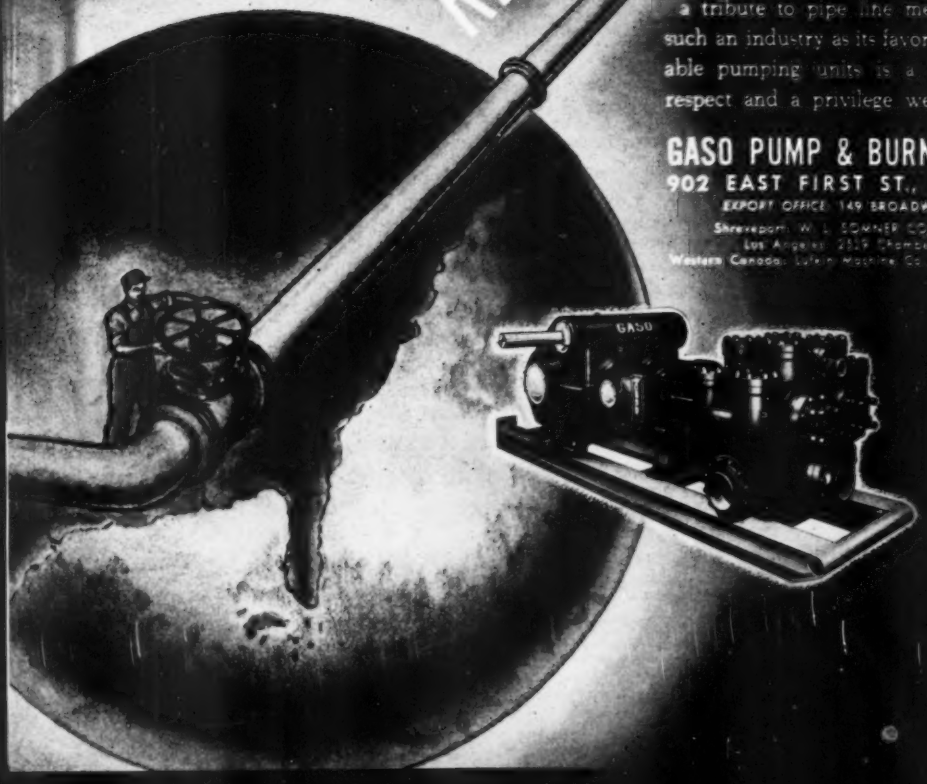
Grinnell Company, Inc., Providence, Rhode Island • Sales Offices and Warehouses in Principal Cities

pipe and tube fittings • welding fittings • engineered pipe hangers and supports
Thermolier unit heaters • valves • Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies • industrial supplies
Grinnell automatic sprinkler fire protection systems • Amco humidification and cooling systems

REACHING FOR THE MOON

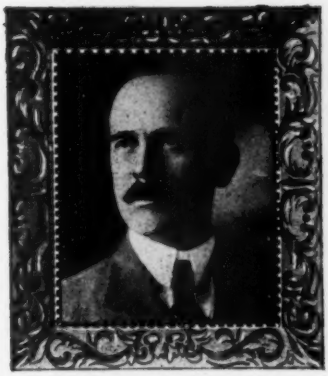
• Today's pipe line mileage (over 156,000) would reach from the earth three-fifths of the way to the moon. Every mile is a direct contribution to the economy and availability of petroleum products, every dramatic development in technique a tribute to pipe line men. To serve such an industry as its favorite source of portable pumping units is a responsibility we respect and a privilege we appreciate.

GASO PUMP & BURNER MFG. CO.
902 EAST FIRST ST., TULSA, OKLA.
EXPORT OFFICE: 149 BROADWAY, NEW YORK
Shreveport: W. L. SOMNER CO., 419 Lake Street
Los Angeles: 2819 Chambers St., Vernon
Western Canada: Lufkin Machine Co., Ltd., Edmonton, Alberta



ADAPTABLE
GASO
PUMPS

ENSIGN'S 40th Anniversary



ORVILLE H. ENSIGN, *Founder*

● When the "Chief," O. H. Ensign, an eminent engineer of his time, founded this company in 1911 he did so with the strong conviction that, "this shall be an engineering organization" dedicated to the principle that a better product will always find a ready market. And so it has been—for 40 years our undivided attention has been devoted to one subject; the engineering and building of Carburetors.

Resulting from this concentration of technical skill has come, we believe, the finest line of Natural Gas and Butane-Propane Carburetors ever built. We are proud of our product. But still we have never stopped pioneering. In our laboratories today are the products you'll see two or three years hence designed to meet the new demands of the engine builder. Meanwhile our three plants are operating at peak production to meet current demands.

For the success we have enjoyed these 40 years we are grateful to a host of loyal employees and customers, many of whom have been with us from the beginning.

ENSIGN'S ORIGINAL FACTORY

ENSIGN
CARBURETOR CO.

7010 S. ALAMEDA ST., HUNTINGTON PARK, CALIF.

HUNTINGTON PARK, CALIF.

CHICAGO 36, ILL.

LOS ANGELES 23, CALIF.

POWELL
is more than a name

It's the hallmark of better quality in valves. That means better performance, longer life and lower cost of maintenance.

Also because Powell makes the valve to suit the service, you have at least two reasons why there are more types of Powell Valves serving industry today *than any other make.*

The Wm. Powell Co., Cincinnati 22, Ohio

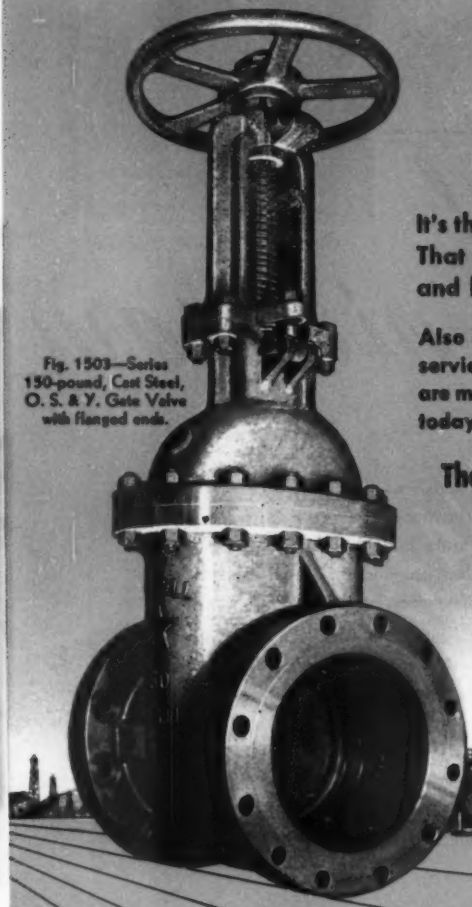
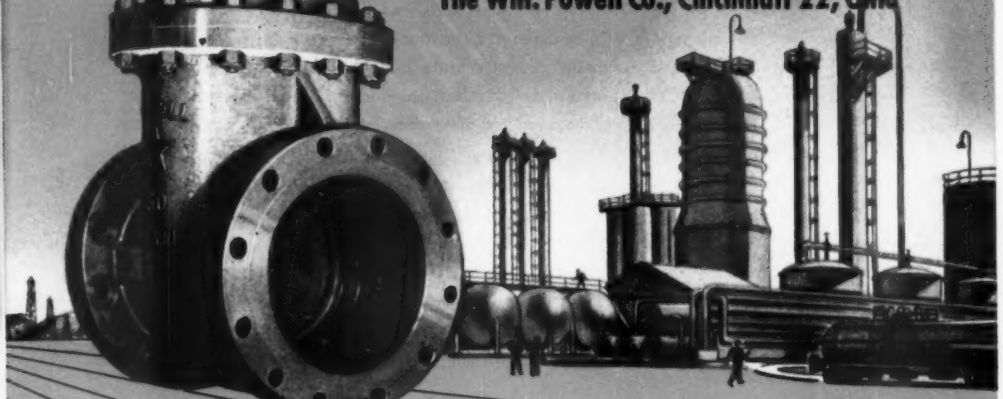


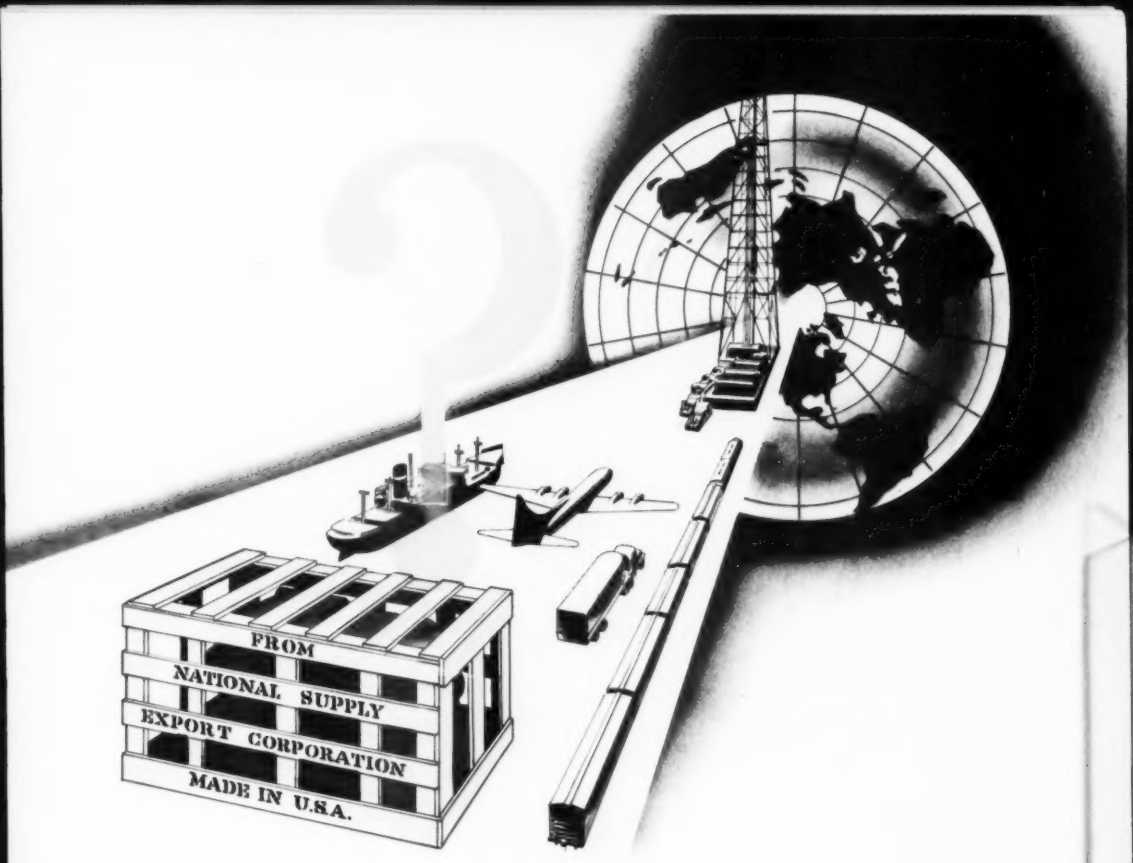
Fig. 1503—Series 150-pound, Cast Steel, O. S. & Y. Gate Valve with flanged ends.



POWELL

BRONZE, IRON, STEEL AND CORROSION-RESISTING VALVES

DEPENDABLE VALVES SINCE 1846



DESTINATION?

OIL COUNTRY—throughout the world—is the destination of National Supply's drilling and pumping equipment.

The National Supply Company was founded over a half-century ago to provide the petroleum industry with machinery and operating supplies. Today, the completely integrated facilities of National Supply produce "National Blue" oil field machinery, engineered for the dependable service and long life which have been proved by performance in the United States, Canada, the Middle East, Central and South America . . . wherever oil is produced in commercial quantities.

What are *your* oil field requirements? National Supply's complete line of rigs, pumping units, Diesel engines and auxiliary equipment and parts, as well as Spang oil country tubular products, will meet any conditions. Our purpose is to serve you—to help you save time and money when drilling and producing oil. Contact your National Supply representative, or check with your nearby National Supply Store for information.

THE **NATIONAL SUPPLY** COMPANY

GENERAL SALES OFFICES: TOLEDO, OHIO

NATIONAL BLUE PRODUCTS

a new product . . .

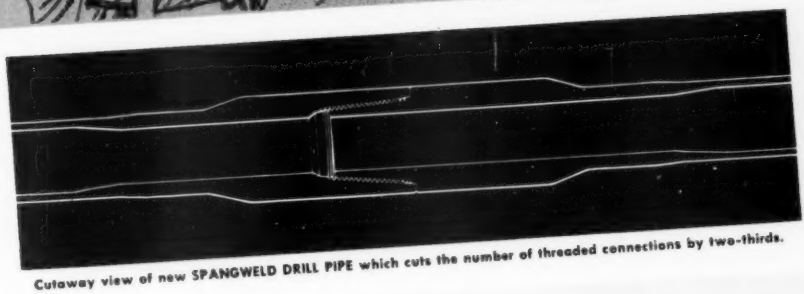
and another progressive step in the development of oil country tubular goods—SPANGWELD Drill Pipe is the only welded combination of Drill Pipe and Tool Joint produced under the complete control of one experienced manufacturer of pipe and joints—National Supply.

The introduction of SPANGWELD is a natural result of the continuing study by National Supply of the improvement of Tool Joints, plus the years of experience of the Spang-Chalfant Division in the production of Drill Pipe.

SPANGWELD is a logical companion of the service proved Shrink Thread Drill Pipe and Tool Joints pioneered under the SPANG label.

SPANGWELD, like SPANG Double Seal Shrink Thread Drill Pipe and Tool Joints, is available in a complete range of sizes, to meet varying drilling requirements.

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT • SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES



Cutaway view of new SPANGWELD DRILL PIPE which cuts the number of threaded connections by two-thirds.

FEATURES AND ADVANTAGES OF NEW SPANGWELD DRILL PIPE

- **Reduces first cost of drilling string.**
- **Reduces threaded elements by two-thirds, and minimizes failure.**
- **Undivided responsibility for the quality of both pipe and tool joint, by a single, experienced manufacturer.**
- **Drill Pipe and Tool Joint are connected by welding, not threads.**
- **Perfect alignment of pipe and joint effected by automatic positioning devices.**
- **Longer joint life under abrasive drilling conditions is assured by hard facing (optional).**
- **Welds are tested by Magnaflux, and the entire assembly by hydrostatic pressure.**
- **Electro-plated threads on tool-joint pins resist initial scoring and galling.**
- **Hard facing can be re-applied in the field when necessary, without fear of warpage.**
- **Streamlined exterior contour of joint reduces turbulence.**
- **Widest range of joint O.D.'s for given pipe diameter; Spangweld offers minimum diameter ratios for slim-hole operations.**
- **Joints made in 22 standard sizes—every diameter and type now in common use.**

Write for your copy of our booklet "How to Make Drill Pipe Last Longer". Address, The National Supply Company, Pittsburgh 30, Pennsylvania.

NATIONAL BLUE PRODUCTS

DIVISION TUBULAR OFFICES:

Denver, Colorado • Fort Worth, Texas • Houston, Texas
Los Angeles, California • Pittsburgh, Pennsylvania • Tulsa, Oklahoma
Calgary, Alberta, Canada

THE **NATIONAL SUPPLY** COMPANY

GENERAL SALES OFFICES: PITTSBURGH, PA.

SPANG-CHALFANT DIVISION

Drilling Power to Spare
with IDEAL ROTARIES

National Supply's complete line of IDEAL Rotaries lets you choose the Rotary best suited to your needs —whether for shallow-hole drilling or deep well operations. Each unit is provided with features especially designed for its rated service range—such features as:

- **Heavy duty ball type main and hold down precision bearings**
- **Spiral bevel gears with hardened teeth**
- **Total seal against mud and foreign material**
- **Non-skid tread safety top**
- **Positive lubrication**

Conservative ratings of all IDEAL Rotaries give the operator drilling power to spare. The accumulation of practical experience obtained through years of close contact between our field engineering staff and IDEAL users is your assurance of long, dependable service life. Whatever your requirements, there's an IDEAL Rotary to meet them.

Write to the National Supply Company for bulletins describing in detail the IDEAL Rotary in the range you need.

THE NATIONAL SUPPLY COMPANY

GENERAL SALES OFFICES: TOLEDO, OHIO

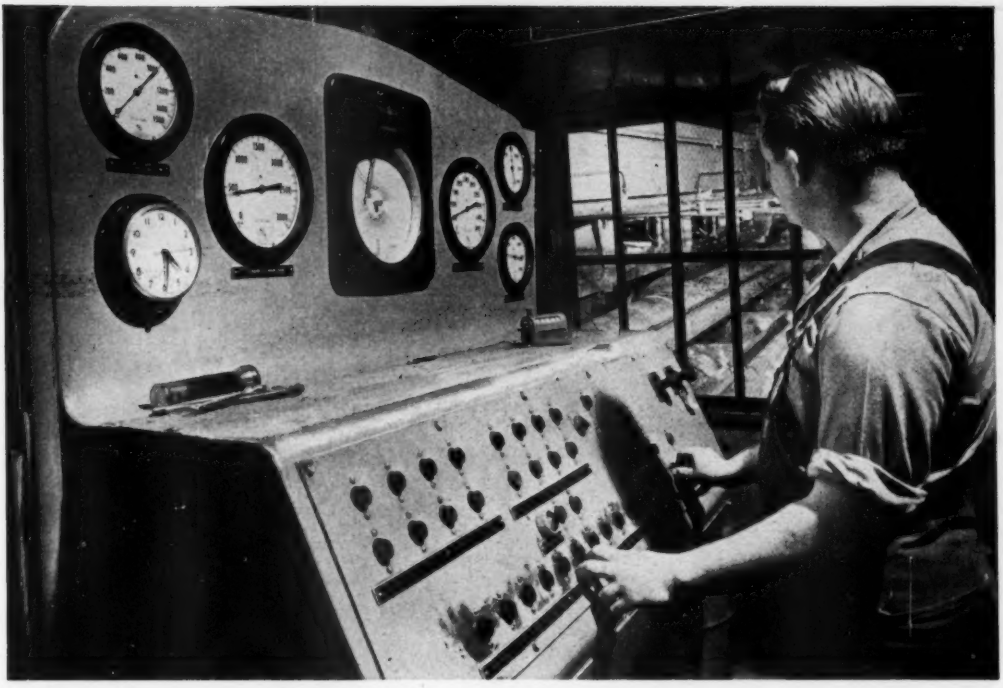
NATIONAL BLUE PRODUCTS

DIVISION OFFICES: Casper; Ft. Worth; Houston; Pittsburgh; Tulsa; Torrance

CANADA: The National Supply Company, Ltd., 702 Barron Bldg., 610 Eighth Ave., West, Calgary, Alberta

EXPORT: National Supply Export Corporation, 600 Fifth Ave., New York 20, N.Y., U.S.A. River Plate House, 12 South Place, London, E.C.2

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT • SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES



He's doing 3 jobs for you

This man is operating equipment that does three important things to assure you of better Basalt-Kaiser line pipe:

It expands line pipe hydraulically within restraining dies to extremely accurate diameter, concentricity and straightness.

It strengthens line pipe through cold working—which means requirements of high yield strength specifications are met.

It tests line pipe with hydraulic pressure after the dies are opened. And while under pressure the pipe is struck blows of measured impact along the seam to further test the soundness of the weld.

Kaiser Steel pipe is being produced to conform to latest API specifications in diameters from ½ inch to 30 inches, and in lengths up to 55 feet. Shipping points are Fontana, and Napa, California.

It's good business to do business with

Kaiser Steel

KAISER STEEL PIPE SPECIFICATIONS • All pipe manufactured to latest A.S.T.M. and A.P.I. specifications

Type	Diameter	Length	Wall Thickness	Shipping Point
Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	8⅝" to 20" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅛" to 12¾" O.D.	Up to 55'	.188" to .400"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	22" to 30" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser

Prompt, dependable delivery at competitive prices • KAISER STEEL CORPORATION Los Angeles, Oakland, Seattle, Portland, Houston, Tulsa, New York

AN IDEA in the minds of a small group of courageous men—that was Gulf half a century ago.

Starting as a small producing company with total assets of $750,000 in the late Fall of 1901, it was soon evident that future success was dependent upon Gulf's ability to operate as an integrated company—and to keep building.

Today, Gulf is an integrated world-wide organization with strong holdings in those countries in the free world where the largest crude oil reserves are located. Its growth has been constant, and currently it enjoys the distinction of being eighth in a select list of twelve American manufacturing companies, each with assets of more than a billion dollars.

But, hard-won gains and past achievements are not enough . . . Still needed are more courage, vision and capital, because we're looking forward to the second half-century.

A 200-million dollar expansion of the company's operations in 1951 is well under way. An aggressive program for the discovery and development of crude oil reserves continues. Refineries are being modernized and expanded. Supertankers are being added to Gulf's existing fleet, and other units of the transportation system are being expanded. Additions are being made to the research laboratories. New service stations will be built, existing ones modernized, and other outlets acquired.

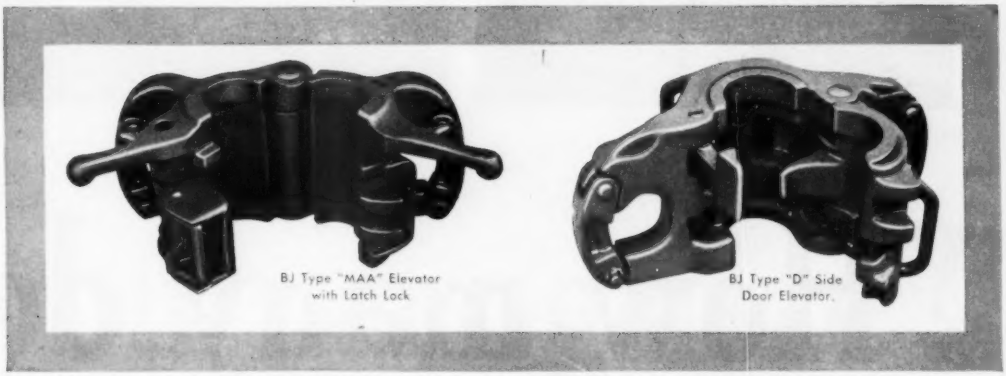
All of this is eloquent and concrete testimony that we are planning for the second half-century.

Only by continuous planning and expanding, research, hard work and strict adherence to the principles formulated and followed in the first half-century can we be sure of giving the quality of service and product we desire to give in the next 50 years.

Gulf Oil Corporation · Gulf Refining Company
Gulf Building, Pittsburgh 30, Pennsylvania

FIFTY YEARS OF SERVICE
1901 GULF 1951
PETROLEUM AND ITS PRODUCTS

BJ *ENGINEERED*
OIL TOOL REBUILDING
*makes old elevators good as **new**!*



BJ Type "MAA" Elevator with Latch Lock

BJ Type "D" Side Door Elevator.

Modern, high speed drilling operations subject an elevator to terrific shock and wear. Here's how BJ's factory rebuilding service repairs worn elevators.

1. Magnaflux inspection finds cracks the eye does not detect.

2. Worn surfaces are rebuilt with carefully selected welding rods.

3. Controlled reheat treatment restores steel to its original physical properties.

4. Precision machining is assured by means of the correct fixtures as used in the original production of BJ elevators. This procedure provides perfect fits and new efficiency.

5. All tool joint lifting surfaces are flame-hardened for maximum life.

6. And the final magnaflux inspection assures you of the care and supervision that goes into the repair of BJ elevators.

ASK YOUR BJ REPRESENTATIVE OR JOBBER...

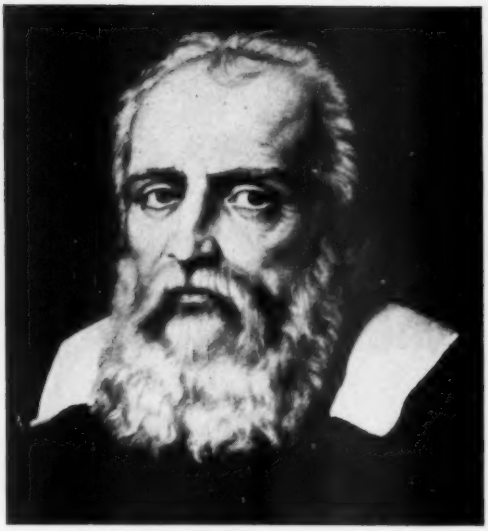
BJ FACTORY SERVICE Engineered OIL TOOL REBUILDING for safety and long life

The men and machines that made 'em know 'em best!

Byron Jackson Co.

MID-CONTINENT AND ROCKY MOUNTAIN SERVICE
6240 Navigation Blvd., Houston, Texas • Woodcrest 8321

PACIFIC COAST SERVICE
7201 E. Hanna Ave., Los Angeles 22, Calif. • Jefferson 5171



How many do

Whether you recognize the first three faces or not, we think you'll know the fourth one. There are thousands of these Taylor FULSCOPE* Controllers in service today, in almost every process industry from chemicals to milk, from petroleum to plastics.

A Taylor FULSCOPE Controller is a rugged, dependable air-operated instrument for control of temperature, pressure, flow, liquid level, density, load and humidity. It was the first controller on the market with completely interchangeable unit construction.

All parts are interchangeable, and every FULSCOPE case is drilled and tapped to hold the most complete set of control responses. Simple controllers can be converted into the most complex, if necessary, right in the field; repairs can be made quickly by your own instrument man.

*Reg. Trade-Mark

The six standard types of FULSCOPE Controllers fit almost any processing need:

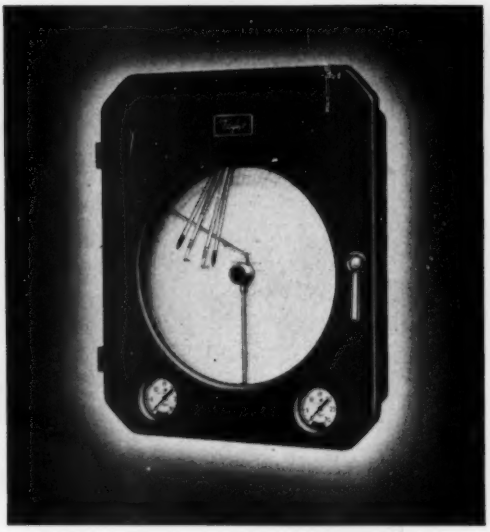
1. For simple on-off control on applications with small time lags and large capacities, regardless of load change, buy a *Fixed High Sensitivity* model.

2. For throttling control on similar applications, you need *Adjustable Limited Range Sensitivity.*

3. Throttling control where you have a wide range of time lags and capacities, infrequent or negligible load changes, calls for *Full Range Adjustable Sensitivity.*

4. Precision control under a wide range of time lags and capacities, with gradual, sustained load changes, calls for *Adjustable Sensitivity with Automatic Reset.*

5. Where there are momentary disturbances, but no sustained load changes, get *Adjustable Sensitivity with Pre-Act.*



you recognize?

6. To meet almost any control problem, get the FULSCOPE Controller with all three control effects: *Adjustable Sensitivity*, *Pre-Act* and *Automatic Reset*. It gives precision control on applications with a wide range of time lags and capacities, and sudden, sustained load changes.

Ask your Taylor Field Engineer how FULSCOPE Controllers can help solve a big majority of your control problems, protect product quality and save money too. Write for Bulletin 98151.

Where pneumatic transmission is preferred, and particularly where graphic panels are wanted, ask about Taylor's revolutionary new three-part TRANSET* Control System too. Write for Bulletin 98097. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.*

Still wondering who the men are? All are founding fathers of the instrument industry. First on the left above is Torricelli, who made the first barometer. Next is Galileo, maker of the first thermometer, and then comes Boyle, who discovered Boyle's Law. The face on the right, of course, is the famous Taylor FULSCOPE Controller. It is found in practically every process industry.

Taylor's Centennial
ACCURACY FIRST
SINCE 1851

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

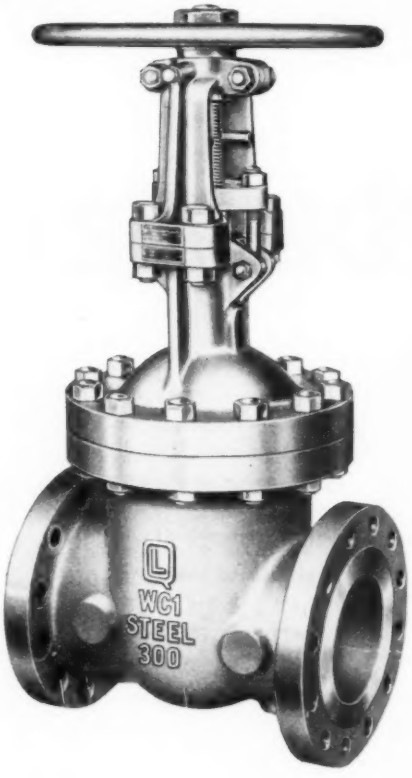
LUNKENHEIMER

. . . The Steel Valve With A Priceless Ingredient

Into every heat of Lunkenheimer molten steel goes one ingredient that no other valve foundry can duplicate. It's not measured in ounces or pounds — but in generations . . . of tradition. It is pride in the kind of workmanship that has made Lunkenheimer universally respected as the one *great* name in valves.

Engineers are accustomed to dealing in facts — not intangibles. But every realistic engineer knows that molten steel is tricky stuff to handle. It demands *more* from the workman than simple attention. Quality valves—safe valves—are not made by formula alone, but by care . . . interest . . . pride in an unbroken tradition of fine workmanship. At Lunkenheimer, that tradition goes back to 1862.

Lunkenheimer's priceless ingredient will always be intangible, but it can be expressed in terms of one interesting fact: *there is no instance on record where a Lunkenheimer steel valve has ruptured due to defective metal.* For more facts — and for information relating to your specific steel valve application — write immediately to The Lunkenheimer Co., P. O. Box No. 360F, Annex Delivery Station, Cincinnati 14, Ohio.



STEEL • IRON • BRONZE

LUNKENHEIMER

THE ONE *Great* NAME IN VALVES

L-750-13C

THE *Peerless*

HYDRO-LINE

ENCASED CLOSE-COUPLED VERTICAL CENTRIFUGAL PUMP

FOR LIMITED NPSH APPLICATIONS IN ALL INDUSTRIAL PROCESSES

...and for installation where floor space is at a premium

For application to: Petroleum Refining Techniques · Line Booster Service · Chemical Processing · Condensate Return Service.

Especially Suited for Pumping: Hydrocarbons, such as Gasoline, Butane, Propane, Oils, etc. · Hot or Cold Water · Acids · Bases · Salt Solutions, in mild or concentrated form at temperatures from normal to 400°F.

PEERLESS PUMPS

HYDRO-LINE CHARACTERISTICS AT A GLANCE

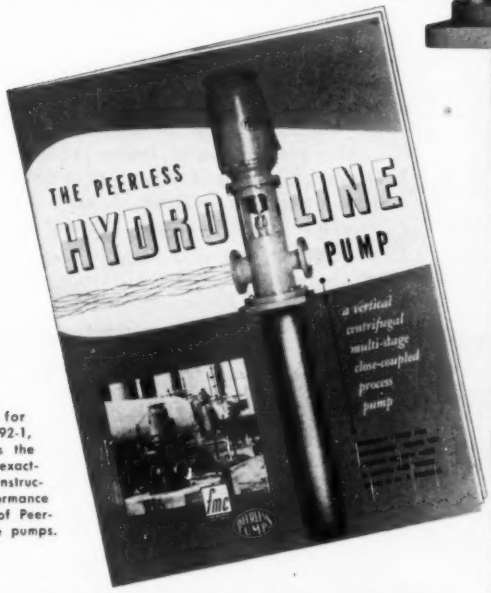
CAPACITIES
Up to 5000 gpm

HEADS
Up to 1500 feet

DRIVES
As required; standard vertical, solidshaft, hollowshaft or explosion-proof motors; steam turbine.

SEALING CHAMBER
Peerless mechanical shaft seal standard construction or packing gland furnished as required.

MATERIALS
Cast iron bowls, bronze impellers, #416 stainless steel shaft standard; any special materials can be furnished on order to suit individual requirements.



USE COUPON for Bulletin No. B-592-1, which describes the successful and exacting design, construction and performance characteristics of Peerless Hydro-Line pumps.

MAIL COUPON FOR BULLETIN

PEERLESS PUMP DIVISION
Food Machinery and Chemical Corporation
301 West Avenue 26
Los Angeles 31, California

Please send us copy of Peerless Hydro-Line Pump Bulletin No. B-592-1.

NAME_____

COMPANY_____

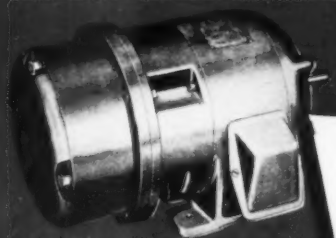
STREET_____

CITY_____ STATE_____

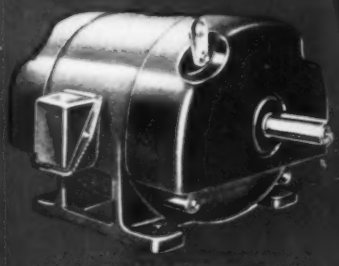
O&GJ

PEERLESS PUMPS fmc

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
Address inquiries to Factories at:
Los Angeles 31, California and Indianapolis 8, Indiana
Offices: New York, Chicago, St. Louis, Atlanta; Dallas, Plainview and Lubbock, Texas; Fresno; Los Angeles; Phoenix; Albuquerque, N. M.



Brake motor using latest disk type brake mounted on BA drip-proof motor. Also available with totally enclosed and splash-proof enclosures for AC or DC applications.



Squirrel-cage splash-proof Form BA. Has corrosion-resistant covers which prevent entrance of splashing liquids.

Mill motor, W600 Series, DC. Conforms in all respects to AISE standards. Offers more power without an increase in the frame size.

If you have a drive that's dirty, dusty, damp or hot—

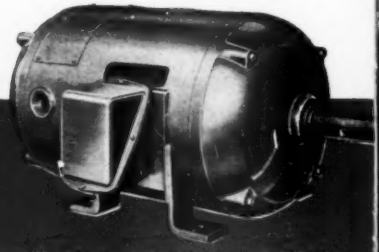
here's the motor for it!

...the

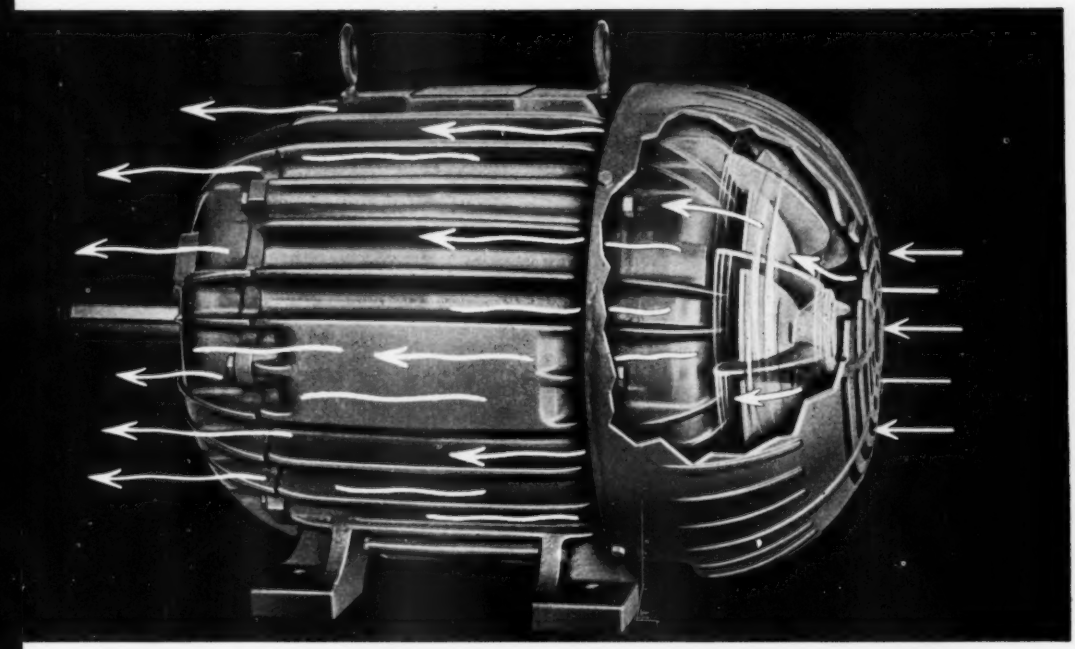
Elliott C-W Sealedpower totally-enclosed fan-cooled squirrel-cage motors are made in capacities from 3 to 125 hp. Write for Sealedpower Bulletin SL-300-2A.

Also available in explosion-proof underwriters approved, in capacities from 20 to 125 hp. For full details write for Bulletin SL-300-5. Address your request to Elliott Company, Dpt. OG, Jeannette, Pa.

...with the ELLIOTT CROCKER-WHEELER complete motor line, you can meet 'most any integral motor need!



Wound-rotor protected type Form BW. For slow, smooth acceleration, high starting torque with low starting current, or variable speed. Drip-proof, splash-proof, 1 to 200 hp.



ELLIOTT CROCKER-WHEELER *Sealedpower* MOTOR

■ This motor is really sealed. There's no way in for dirt, dust, moisture or fumes. But there *is* an easy out for heat—by way of the many fins which are constantly swept by the fan-driven air blast.

That powerful, continuous air blast sweeps off all dirt and dust. Only under unusually dusty conditions is cleaning necessary, and then rarely, with a quick dusting off. Backing off four capscrews removes the fan cowl, if you *should* want to get at the fan—which is hardly ever necessary.

DURING THE PAST TEN YEARS thousands of these Sealedpower motors have gone into successful service. They were ahead of the field then, and they still are.

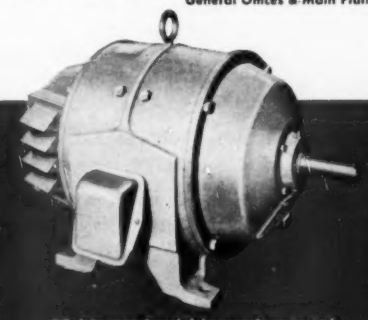
ELLIOTT COMPANY
Crocker-Wheeler Division
AMPERE, N. J.

BRANCH OFFICES AND REPRESENTATIVES IN PRINCIPAL CITIES
ELLIOTT *Approved* SERVICE SHOPS COVER THE COUNTRY
General Offices & Main Plant — Jeannette, Pa.

1901 HALF CENTURY OF POWER PROGRESS 1951

CW-29

Squirrel-cage protected type Form BA. An open drip-proof motor for general purpose use. It is available in wide modifications to meet a variety of conditions.



DC drip-proof and drip-proof-protected types Form F, in ratings to 7½ hp, Form H, 10 to 200 hp.

Squirrel-cage, totally-enclosed, non-ventilated Form BE. Available up to and including 3 hp at 1800 rpm, for applications requiring protection against dust, fumes, moisture.

When *Speed* Counts

You Can Count On Bucyrus-Eries

WHEN fast-moving "hands" are needed for your oil field maintenance jobs, pick the winners — Bucyrus-Erie hydraulic and cable bulldozers. They're winners because of field-proven performance features that can pay off on *your* lease, too.

Mounting Bucyrus-Erie bulldozers on International tractors does not materially change the tractor balance point — Balanced Design is the reason! Greater operating speed through even weight distribution, full tractive effort and maximum force concentrated at the blade are all benefits of *Balanced Design*. Tractor operating characteristics remain the same after adding the bulldozer attachment. Blade loads have no effect on free track oscillation — full ground contact permits transmitting full tractive effort to the blade.

Scientifically curved blades roll the dirt and keep it "alive". Load resistance is substantially reduced to get the job done in a hurry.

For the detailed and complete story on these hard-hitting machines call on your International Industrial Tractor distributor — he'll show you the *fast* way to handle oil field maintenance!

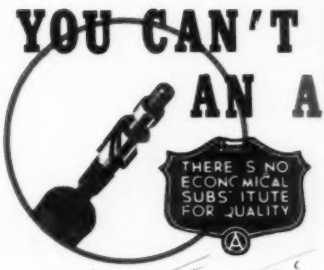
300751

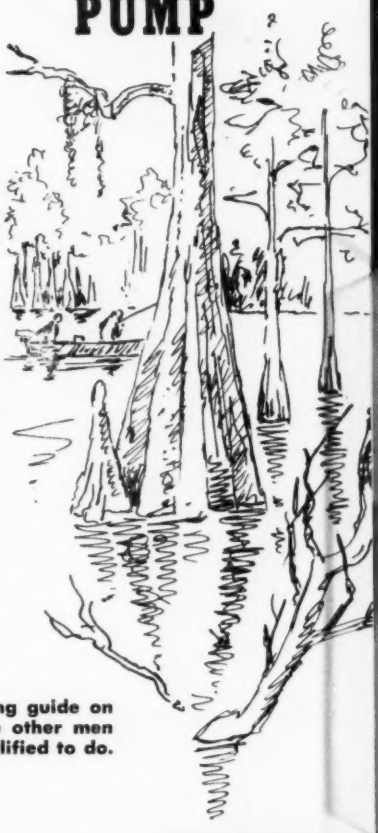
BUCYRUS ERIE

SOUTH MILWAUKEE
WISCONSIN

See Your INTERNATIONAL Industrial Tractor Distributor

YOU CAN'T BEAT (or wear out!) AN AXELSON BOTTOM HOLE PUMP





An Axelson Pump starts out by being exactly right for the job it has to do. Your near-by Jones & Laughlin Supply store sees to that. It has an Axelson Pump, and interchangeable parts for that pump, *exactly right* for conditions in your wells.

Then . . . you can't wear out that pump. Wear eventually occurs, of course, but our pump repair shops make any worn Axelson as good as new. And we mean that . . . *as good as new!*

You'll never know what it means to be completely satisfied with a bottom hole pump, and pump repair service, until you try the Axelson recommended by your Jones & Laughlin Supply store.

For down-to-earth local information why don't you 'phone the store NOW, or drop in.

A hunting guide in the Wyoming Tetons or a fishing guide on Black Lake down in Louisiana look essentially like other men . . . but can do things for you that few men are qualified to do. And it's that way with an Axelson Pump.

AMERICA NEEDS SCRAP TO MAKE MORE STEEL

"... here's My warehouse!"

Jones & Laughlin Supply Company

J&L STEEL

Subsidiary of Jones & Laughlin Steel Corporation

EXPORT: 405 Lexington Ave., New York, N. Y., U. S. A.

82 STORES • 17 OFFICES • 7 RESIDENT SALESMEN

***General Offices:* TULSA, OKLAHOMA**

On Transcontinental's half-billion cfd line

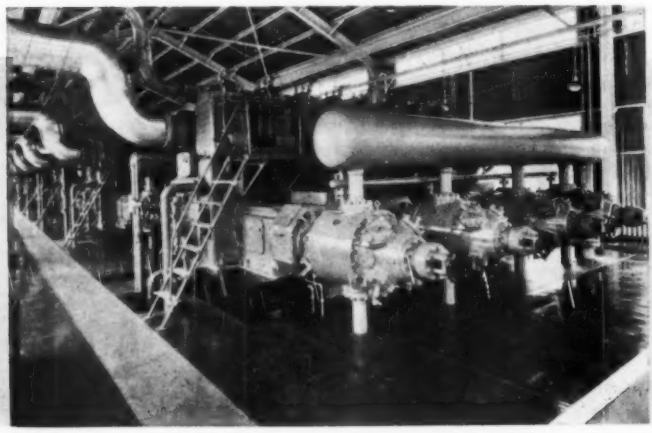
only Clark has both Centrifugal and

Assigned to the job of handling 555,000,000 cfd of gas thru-put in eight Transcontinental Gas Pipe Line Corporation's compressor stations are 3 steam turbine driven Clark Single Seal Centrifugal Pipeline Compressors and 49 Clark BA-8 and HBA Gas-Engine-Driven Compressors, representing a total of 96,380 installed brake horsepower.

But to Transcontinental, like numerous other gas pipe line companies, these 52 Clark units represent far more than fulfillment of required capacity and horsepower. Primarily, they represent *proved performance, proved design features.* For it was Clark that originated the single seal centrifugal compressor — designed specifically for gas transmission pipe line work. And it was Clark that designed the first big reciprocating pipe line compressor, the BA.

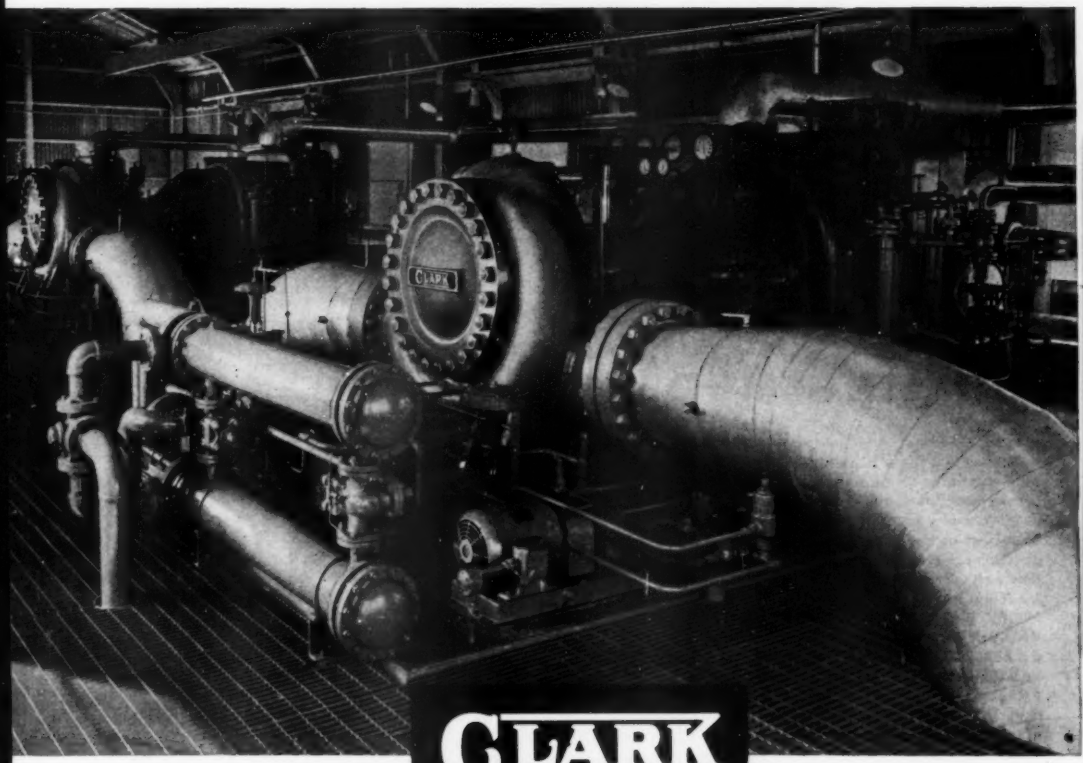
In any large volume application, it only makes sense to seek recommendations from the company that builds both . . . large gas-engine-driven reciprocating compressors and large centrifugal pipeline compressors. That's the only way to be assured of an unbiased analysis. For each has its distinct advantages under certain conditions. Only Clark engineers *can* give you that unbiased analysis, for Clark *builds* both.

Three, steam turbine driven, Clark Single Seal Centrifugal Pipeline Compressors representing a total of 16,860 BHP, installed on the Transcontinental line at Billingsley, Alabama.



Seven Clark Big Angle, Gas-Engine-Driven Compressors with a combined total of 11,200 BHP installed on the Transcontinental line at Orange, Virginia. Forty-two other Big Angle Compressors power other stations.

Reciprocating Compressors



There's a BIG difference in...

CLARK COMPRESSORS

CLARK BROS. CO., INC. • OLEAN, N. Y.

One of the Dresser Industries

New York • Tulsa • Houston • Chicago • Boston • Washington • Pittsburgh
Los Angeles • Birmingham • Detroit • Salt Lake City • San Francisco • Buffalo
London • Paris • Varese, Italy • Ankara, Turkey • Buenos Aires • Caracas,
Venezuela • Lima, Peru • Bogota, Colombia • New Delhi, India • Rio de Janeiro
Calgary, Alberta, Canada • Brussels, Belgium

THERE'S PLENTY AVAILABLE

Magcobar

DRILLING MUDS

In these times of shortages, we are glad to be able to tell you that **there is plenty of Magcobar drilling mud available** at fair and reasonable prices for your present and future drilling operations.

We are also proud to tell you **why** there is plenty of mud weight material . . . even though operators are now using mud weight material at the rate of 500,000 tons per year: THERE IS PLENTY OF MUD WEIGHT MATERIAL AVAILABLE AT FAIR AND REASONABLE PRICES TODAY BECAUSE MAGCOBAR PIONEERED AND DEVELOPED A PROCESS TEN YEARS AGO THAT INCREASED THE COUNTRY'S BARITE RESERVES BY MORE THAN 15,000,000 TONS.

Look for the Magcobar dealer sign when you need mud. More than 350 Magcobar Dealers from Canada to the Gulf Coast are ready to serve you.

MAGNET COVE BARIUM CORPORATION
ONE OF THE DRESSER INDUSTRIES
HOUSTON, TEXAS • MALVERN, ARKANSAS

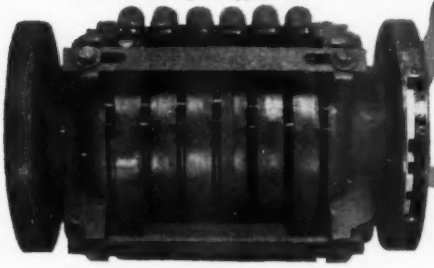
Magcobar
Complete
DRILLING MUD SERVICE
DEALER

HERE'S WHY

CMH Expansion Joints are preferred by so many piping engineers

- ✓ Space Saving
- ✓ Weight Saving
- ✓ Streamlined Flow
- ✓ Lower Overall Cost
- ✓ Ease of Installation
- ✓ Trouble Free Operation
- ✓ Freedom from Maintenance

CMH Free-Flexing Expansion Joints for pressures to 30 psi; stainless steel or copper; flanges or welding ends; standard sizes to 30" I.D.; larger sizes available for special applications.



CMH Controlled Flexing Expansion Joints for pressures to 300 psi; stainless steel or copper; flanges or welding ends; sizes to 30" I.D.

CMH Flexoniflex Expansion Joints with integral control rings for pressures to 1500 psi; stainless steel and other alloys; standard sizes ⅜" through 6" I.D.; larger sizes also available.

THE PROBLEMS of pipe motion control are reduced to a minimum when you use CMH corrugated type expansion joints. Scientifically formed by advanced methods, they represent the modern, cost-saving, trouble-saving way to control axial, lateral or radial motion in piping or to correct for misalignment.

For new installations or for replacement of obsolete equipment, specify CMH expansion joints. Complete data is given in CMH'S Expansion Joint Design Guide. Write for a copy . . . it's the first step towards eliminating the headaches that are so often a part of pipe-line motion control. See our catalog in Sweets.

Flexon identifies CMH products that have served industry for over 49 years.

CHICAGO METAL HOSE Corporation

1345 S. Third Ave. • Maywood, Ill. • Plants at Maywood, Elgin, Rock Falls, and Savanna, Ill.
In Canada: Canadian Metal Hose Co., Ltd., Brampton, Ont.

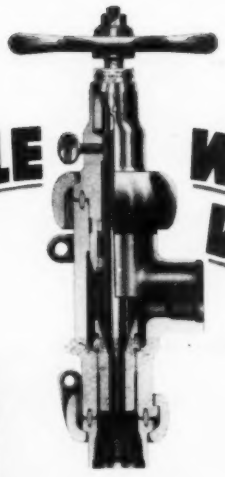
CMH

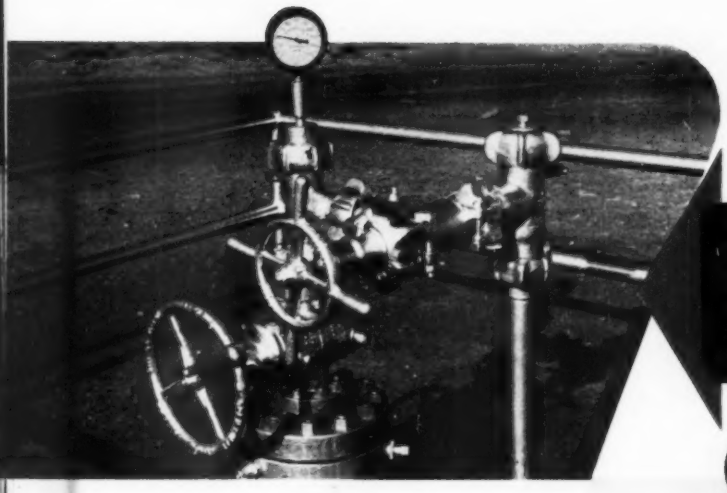
ONE DEPENDABLE SOURCE
for every flexible metal hose requirement

Convoluted and Corrugated Flexible Metal Hose in a Variety of Metals • Expansion Joints for Piping Systems
Stainless Steel and Brass Bellows • Flexible Metal Conduit and Armor • Assemblies of These Components

ON HIGH PRESSURES OR LOW, PRODUCTION FROM ANY WELL CAN BE BETTER CONTROLLED WITH

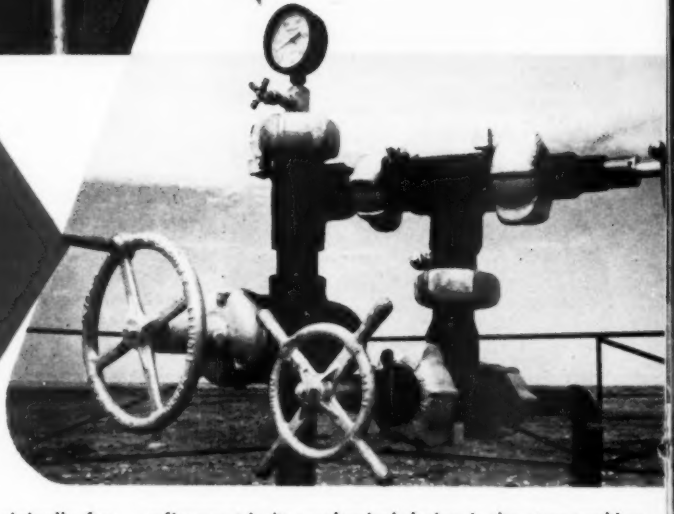
The new UNIBOLT ADJUSTABLE WING VALVE





On high pressure wells, IT'S A DEPENDABLE, LOW COST WING VALVE

On low pressure wells, IT'S A PRECISE, TROUBLE-FREE, ADJUSTABLE CHOKE



The UNIBOLT Wing Valve, designed originally for use as an adjustable choke where well conditions did not demand a positive choke, has become popular with production men as a dependable valve for numerous services where a positive shut-off is essential. Christmas trees for both producing and injection wells, high pressure oil and gas separator manifolds, heater manifolds, meter runs and similar services are made to order for this dependable, yet relatively low-cost, valve. Since high pressure wells are usually produced through a small positive choke, the one-inch opening provided in the UNIBOLT Wing Valve when in full open position is ample to assure unrestricted flow. An additional advantage is the replaceable stem and seat, which may be changed in the field, easily and at low cost. A recent refinement in its mechanical design is the stem packing which, after the valve is assembled at the factory, never requires adjustment or tightening.

Having standard UNIBOLT Couplings between its component parts, the UNIBOLT Wing Valve is easily dismantled or assembled, and may be readily converted to a Positive Choke Body by substituting a blanking plug and positive bean for the stem and seat assembly.

Available in 6,000, 10,000 and 15,000 lbs. test, and in corrosion resistant alloy.

THORNHILL-CRAVER COMPANY

HOUSTON TEXAS

THIS IS URGENT

Production Scrap *alone* won't make the steel you need!

Read what Defense Mobilizer Charles E. Wilson says:*

"In order to achieve the tremendous goal of 110,000,000 tons of steel this year, 36,000,000 gross tons of iron and steel scrap must be channeled back to the steel mills and foundries. That is 6,500,000 tons above what was needed in 1950. *Normal scrap recovery sources cannot produce such amounts. Emergency sources must be discovered and activated.*"

**In a letter to the editor of* PLANT ENGINEERING, *Aug. 10, 1951.*

ALL OF US MUST DIG DEEPER—*GET OUT THE HIDDEN SCRAP!*

Your plant could be one of the emergency sources Mr. Wilson is talking about. Appoint a scrap and salvage team. Study plant layout to determine what can be scrapped. Then turn it up and turn it over . . . to your scrap dealer for cash.

Check your plant for obsolete, broken, worn-out and irreparable:

☐ machinery ☐ dies ☐ jigs ☐ fixtures ☐ tanks ☐ boilers ☐ rails ☐ pipe and fittings
☐ motors ☐ machine bases ☐ tools ☐ chain ☐ structural steel ☐ valves ☐ starters
☐ transformers ☐ castings ☐ steel barrels ☐ nuts and bolts

Sell them to your scrap dealer NOW!

REPUBLIC STEEL CORPORATION

General Offices • Cleveland 1, Ohio

REPUBLIC STEEL

"Safe" under any conditions

LOUIS ALLIS EXPLOSION-PROOF MOTORS

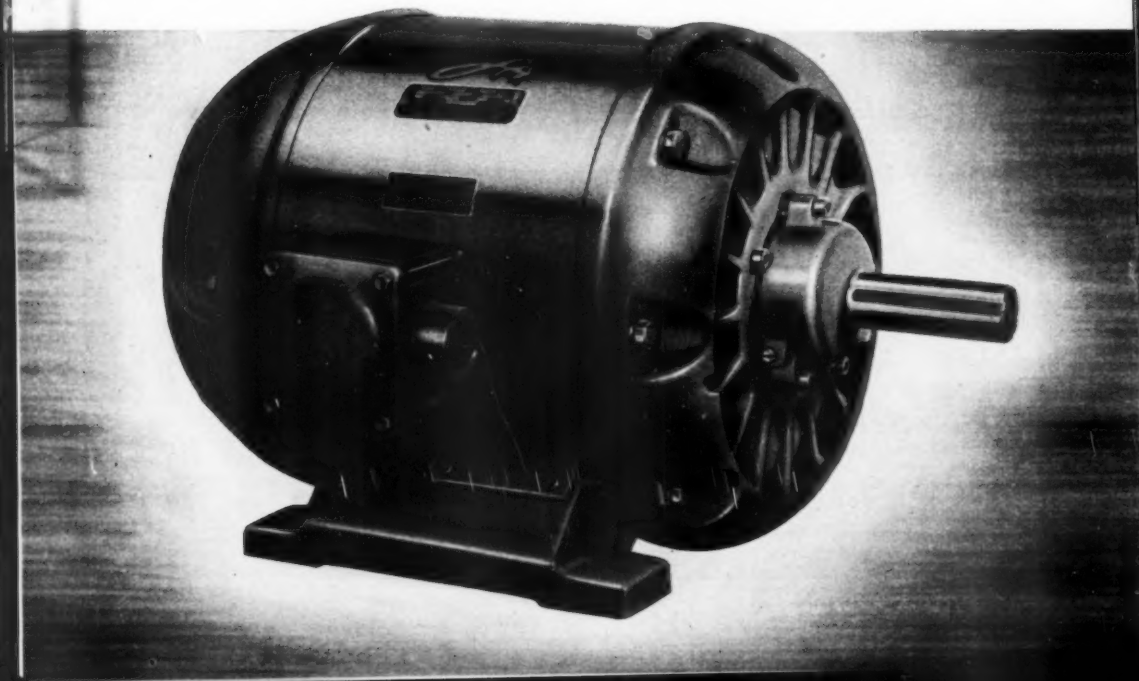
Louis Allis explosion-proof motors have the Underwriters' Laboratories approved labels for all types of hazardous conditions—Class I, Group D for explosive liquids and vapors; Class II, Group G for combustible dust; Class II, Group F for carbon black, coal and coke dust; Class II, Group E for combustible metal dust.

There is a modern streamlined Louis Allis Explosion-Proof motor to satisfy your most exacting specifications. A careful comparison and analysis will show you that Louis Allis Explosion-Proof motors offer you more dependable performance, convenience, long life and safety.

For quick, dependable service contact your nearest Louis Allis Sales Engineers.

CHAMPIONSHIP PERFORMANCE

THE LOUIS ALLIS CO., Milwaukee 7, Wis.

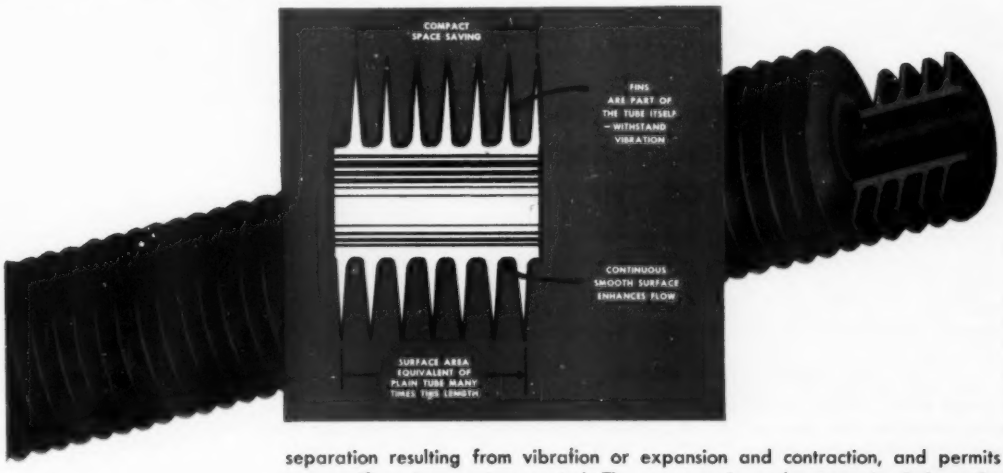


HIGHER EFFICIENCY from less working space

These six words briefly describe the noteworthy performances that Wolverine Trufin*—the integral finned tube—is showing wherever it forms a part of heat exchangers.

As if developed expressly for the defense effort, Trufin is THE answer to today's cry for more production because it possesses the physical advantages of greater capacity.

Just a glance at its unique construction will tell you why Trufin performs so well. Note that the fins are part of the tube itself. Thus there is a positive, uninterrupted thermal flow. This one-piece construction removes the hazard of fin and tube



separation resulting from vibration or expansion and contraction, and permits more uniform temperature control. The space-saving advantage is obvious; the equivalent outside surface area of a 19" length of plain tube, ⅝" diameter, for instance, can be obtained in just one inch length of Trufin of the same diameter. The continuous, smooth surface between the fins, too, enhances the flow of liquids through them and lessens the tendency for the formation or accumulation of obstructions that necessitate more frequent cleaning.

Trufin is available in a variety of alloys, including bi-metal; in a wide range of sizes, fin spacings and heights. If you are retubing or installing new heat exchangers or condensers, consider Trufin—the tube recognized for its high efficiency.

Would you like a Bulletin that gives detailed information about operating heat exchangers efficiently? Ask for a copy on your stationery. *Reg. U. S. Pat. Off.

Wolverine Trufin and the Wolverine Spun End Process available in Canada through the Trufin Tube Co., London, Ontario.

WOLVERINE TUBE DIVISION
Calumet & Hecla Consolidated Copper Company
INCORPORATED
Manufacturers of seamless, nonferrous tubing
1459 CENTRAL AVENUE • DETROIT 9, MICHIGAN

Wolverine Condenser tubes stocked by Butler Industries, Inc., 355 South Fourth Street, Beaumont, Texas. Telephone Beaumont 5-2351.

PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA
Sales Offices in Principal Cities

Export Department, 13 E. 40th St., New York 16, N. Y.

Here's How To Assure Good Welding Fit-Up

Copyright, 1951, General Electric Company

SAVE TIME, POWER, ELECTRODES USE GOOD TECHNIQUES AND THE RIGHT ELECTRODE FOR THE JOB

Improper fit-up of joints to be metal arc-welded can slow production, waste man-power and electrodes, and increase costs at a tremendous rate. This is especially true of fillet welds on which the size of the fillet must be increased to compensate for poor fit-up if the joint is to have full strength.

TO ASSURE GOOD FIT-UP:

1. DESIGN JOINTS CAREFULLY—give careful consideration to the type and size of joints to be welded; simplify fit-up by eliminating irregular contours wherever possible.

2. ALLOW FOR DISTORTION—otherwise excessive gaps may appear in the fit-up of unwelded joints as assembly progresses.

3. CUT AND SHAPE PARTS ACCURATELY—inaccuracy which results from haste or the use of machines improperly adjusted or in need of maintenance is one of the greatest single causes of poor fit-up.

4. WELD IN PROPER SEQUENCE—weld least-contracting joints last, divide weldments into sub-assemblies, and weld outward from the center of a rigid structure.

To Assure Yourself of the Best in Electrodes:

Insist on G-E electrodes. They give you high deposition rates, meet AWS specifications, and are available in a wide variety of sizes and types.

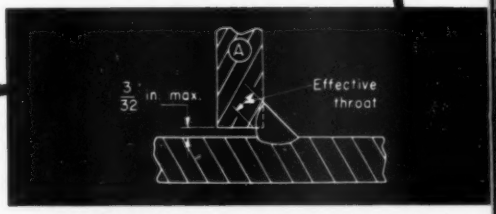
NEW! WELDING ELECTRODE SLIDE COMPARATOR

tells in an instant the AWS designation of manufacturer's electrodes.

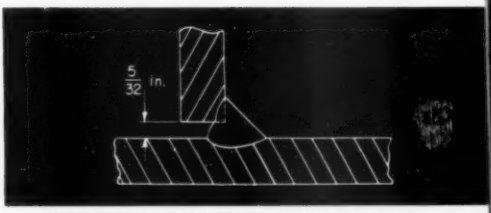
See your G-E Welding Distributor for your comparator. Look for General Electric under "Welding Equipment" in the yellow pages of your telephone directory. And remember, he carries a complete line of G-E welders, electrodes and accessories.

GENERAL ELECTRIC

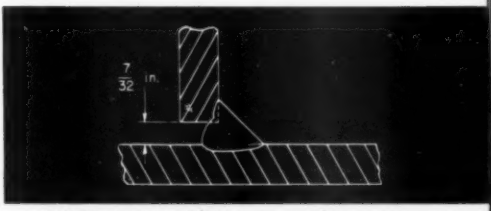
712-10



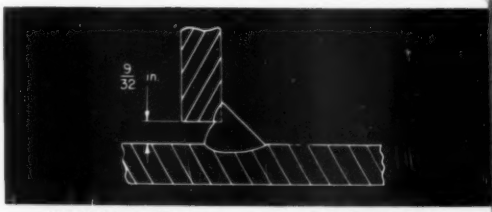
GOOD PRACTICE—Full throat size and strength are obtained when the fit-up gap is as much as 3/32 inches. The deposit penetrates the corner of Plate A as much as 3/32 inches. Larger gaps require excess welding.



WASTEFUL—With a 5/32-inch gap, a 3/8-inch fillet must be made to produce the strength of a 5/16-inch fillet. This requires approximately 50 per cent more time, power and electrode.

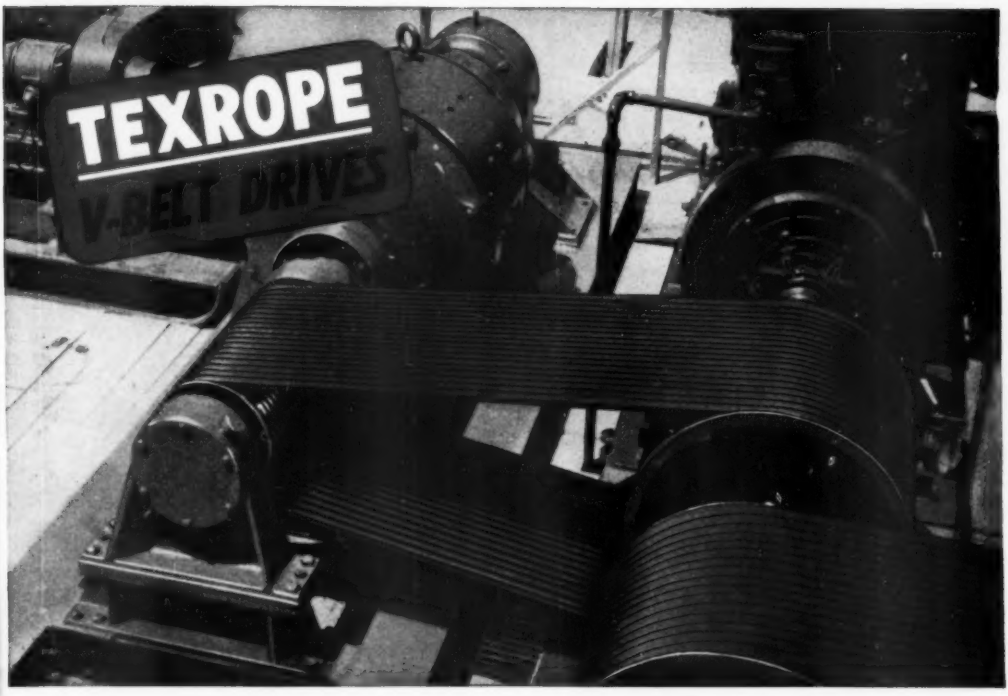


WASTEFUL—With a 7/32-inch gap, a 7/16-inch fillet must be made to produce the strength of a 5/16-inch fillet. This requires 100 per cent more time, power and electrode.



WASTEFUL—A 9/32-inch gap is a condition that ordinarily requires reassembling. If not refitted, it will require 200 per cent more time, power and electrode to produce the strength of a 5/16-inch fillet.

Count off!!
J&L STEEL
THE PARADE OF VALUES IN J&L
BLUE RIBBON INTEGRAL-JOINT DRILL PIPE
ONE
Heat-treated Blue Ribbon Alloy Steel throughout the full length of the drill pipe. Blue Ribbon I-J Drill Pipe gets careful full length heat treatment involving normalizing and temper treatments to refine the grain structure of this patented air hardened steel.
TWO
Special alloy wear bands on the box end of the tool joint section provide maximum resistance to abrasion.
THREE
Forged upsets on the seamless drill pipe (no welds) form a complete integral tool joint.
FOUR
Physical properties of J&L I-J Drill Pipe are uniformly high. Average yield strength —91,000 Psi, Minimum—80,000 Psi; Average tensile strength—116,000 Psi, Minimum—105,000 Psi; Elongation in 2" —Average—25%, Minimum—20%.
FIVE
Only one offset along the inside of the tool joint means considerable reduction in mud turbulence at the joint—an efficiency factor that may be used in reducing mud pressure at pumps or to increase mud velocity at the bit.
SCRAPPY SAYS:
AID DEFENSE
MORE SCRAP TODAY...
MORE STEEL TOMORROW
And these are only a few of the advantages offered by J&L Blue Ribbon Integral-Joint Drill Pipe. Why not contact th J&L representative nearest you today? You'll finu knowing all the facts about J&L I-J Drill Pipe efficiency pays in terms of lower drilling costs.
JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PENNSYLVANIA



Complete Stocks

WHEREVER THERE IS OIL!

WHEREVER THERE IS OIL, you will find *Texrope* dealers, ready to supply single and multiple V-belts, standard and variable-speed sheaves. Stocks for quick replacement are available at dealers in the oil field locations shown at the right.

DEPENDABILITY

Texrope drives using the popular *Magic-Grip* sheaves are inherently easy, quick, and economical to install as compared to other types of power transmission equipment.

And it's a good idea to team *Texrope* V-belts with *Magic-Grip* sheaves. The belts are engineered and manufactured to exacting standards. Every one is carefully weighed and inspected during construction . . . precision molded and cured in accurate steel dies. Belts have straight sides necessary for gripping action.

Get everything you need in V-belt drives from one reliable source. For complete Allis-Chalmers V-belt information, call your nearby *Texrope* dealer, or write Allis-Chalmers, Milwaukee 1, Wis.

A-3110

Texrope and *Magic-Grip* are Allis-Chalmers trademarks.

Genuine *Texrope* V-belts and Drives are available through dealers in any of these cities.

ARKANSAS
Magnolia

CALIFORNIA
Los Angeles

KANSAS
Great Bend
Plainville
Wichita

LOUISIANA
Houma
Lake Charles
New Orleans
New Iberia
Shreveport

MISSISSIPPI
Brookhaven
Laurel
Natchez

NEW MEXICO
Eunice
Hobbs

OKLAHOMA
Duncan
Edmond
Oklahoma City
Pauls Valley
Tulsa
Elk City
Ardmore

TEXAS
Abilene
Bowie
Dallas
Falfurrias
Fort Worth
Fullerton
Gainsville
Houston
Kermit
Kilgore
Odessa
Refugio
San Antonio
Snyder
Sundown
Wichita Falls
Midland
San Angelo
Breckenridge

WYOMING
Casper

NEW YORK
New York City

A-C ALLIS-CHALMERS

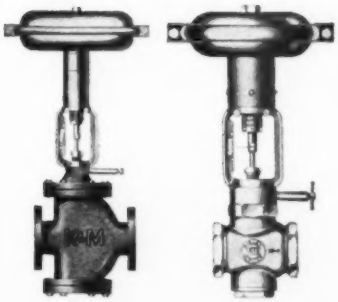
ALLIS-CHALMERS

Why Most Leading Companies Are Using K & M Control Valves

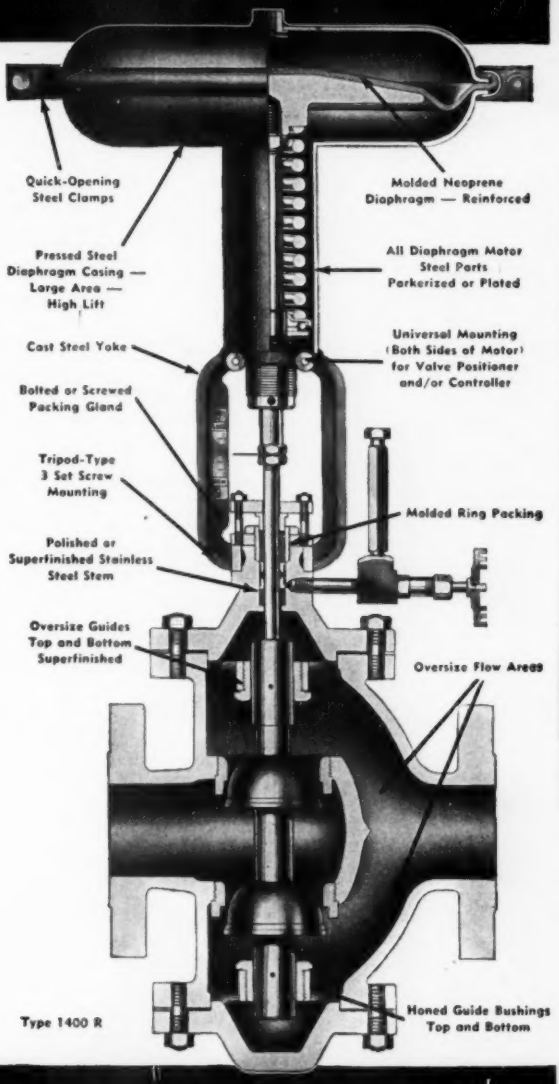
It is logical that leading companies should handle the important subject of control valves as they do other matters: They make use of the best available skills and thinking. More and more, they utilize the equipment, knowledge and facilities of the K & M engineering and service team.

Five years ago, K & M Advanced-Type Control Valves were new to industry. Today, with outstanding performance records behind them, K & M valves have become first in the regard of many instrument engineers. Increasingly, K & M representatives are called upon to give counsel and assistance in the planning of new control installations and the improvement of old ones. During the past year K & M men have been consulted on most of the projects in which control valves have been a major consideration.

There is a qualified K & M representative near you, eager to discuss your problems and able to help you with them.



Type 1200 Type 1000


Quick-Opening Steel Clamps
Molded Neoprene Diaphragm — Reinforced
Pressed Steel Diaphragm Casing — Large Area — High Lift
All Diaphragm Motor Steel Parts Parkerized or Plated
Universal Mounting (Both Sides of Motor) for Valve Positioner and/or Controller
Cast Steel Yoke
Bolted or Screwed Packing Gland
Tripod-Type 3 Set Screw Mounting
Molded Ring Packing
Polished or Superfinished Stainless Steel Stem
Oversize Guides Top and Bottom Superfinished
Oversize Flow Areas
Honed Guide Bushings Top and Bottom

Type 1400 R

K&M

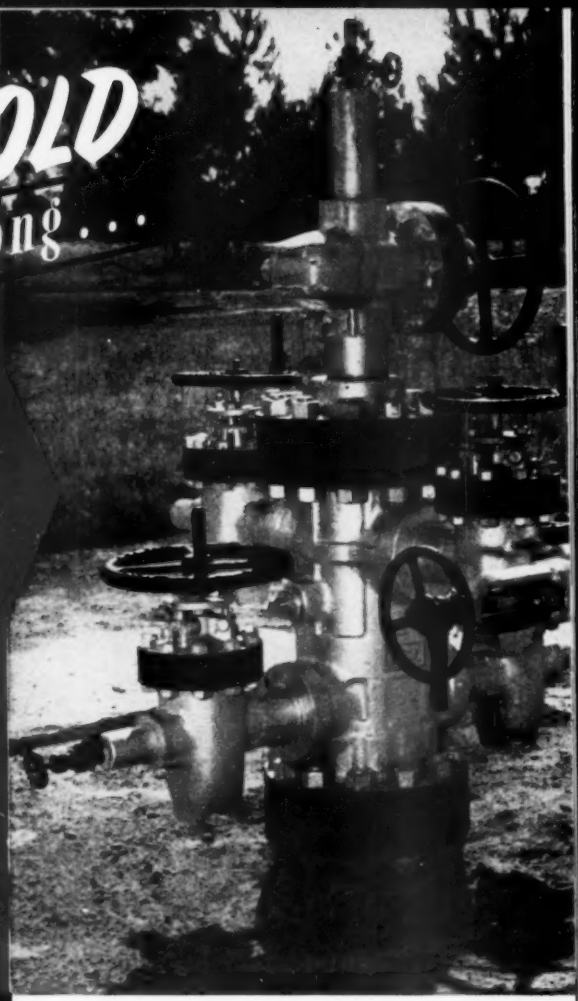
KIELEY & MUELLER, INC.

Valve Makers Since 1879

2017—43rd STREET NORTH BERGEN, N. J.

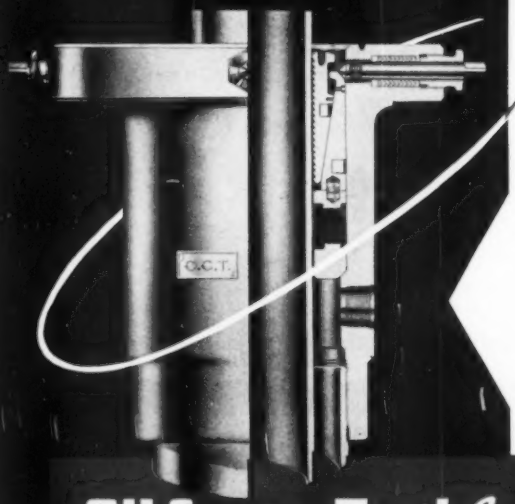
15 YEARS OLD
and still going strong...

NOT A SINGLE PIECE OF ORIGINAL EQUIPMENT HAS BEEN CHANGED OR REPAIRED ON THIS O-C-T ASSEMBLY



According to the record, this O-C-T 6000 lb. test assembly was nipple up on October 1, 1936. Tubing pressure at that time was 2900 lbs. Since then, the operator has had absolutely no maintenance or expense on the tree. The service given by this O-C-T Christmas tree is typical of that given by thousands of other O-C-T well head assemblies throughout the oilfields of the world.

Talk to your O-C-T representative about your well head assembly requirements. O-C-T products are always dependable and available through more than 700 conveniently located supply stores.



...and this is the head of the future

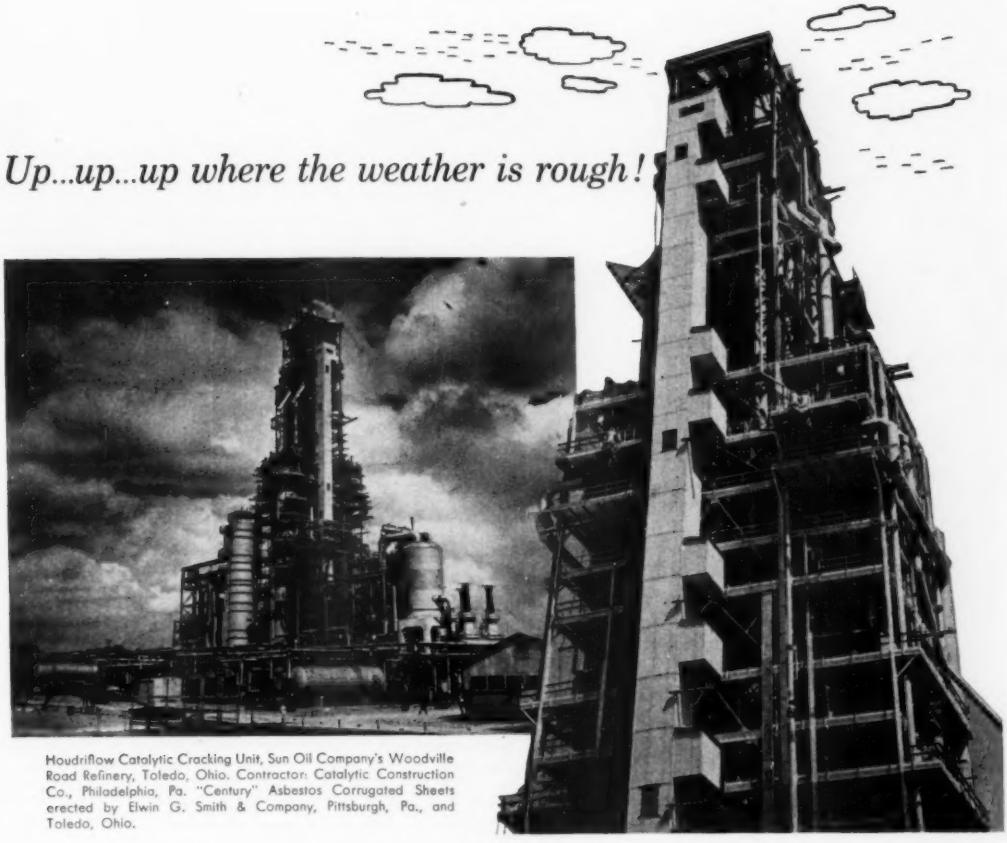
This is the O-C-T "C-19" Casing Head, the only casing head that meets every well completion condition with a single compact model.

Every man on the drilling-production team has good reasons for liking the O-C-T "C-19" casing head. When dropped through preventers, suspension and seal are automatic. Thus, the "C-19" casing head eliminates open hole hazards. In addition, load capacity is twice as great as conventional slip hangers... slips set evenly and bite evenly... no field welding is required... hazardous installation work in muddy and cramped cellar space is reduced to a minimum and hours of valuable rig time are saved. Yes, it's true no other casing head gives you O-C-T flexibility and safety. Ask your O-C-T Representative for details.

Oil Center Tool Co.

Export Representatives: [illegible] Ltd., Eastleigh, Middlesex, England. Address Export Inquiries for All Other Countries to P. O. Box 3015, Houston, Texas.

Up...up...up where the weather is rough!



Houdriflow Catalytic Cracking Unit, Sun Oil Company's Woodville Road Refinery, Toledo, Ohio. Contractor: Catalytic Construction Co., Philadelphia, Pa. "Century" Asbestos Corrugated Sheets erected by Elwin G. Smith & Company, Pittsburgh, Pa., and Toledo, Ohio.

Men and equipment are permanently protected by "Century"® Corrugated Asbestos-Cement Sheets

High on the side of this catalytic cracking tower there are no wind breaks . . . no shade . . . nothing to block driving rain and the fury of storm. Yet inside the elevator tower it's always dry . . . always protected . . . always "a nice day." "Century" Corrugated Asbestos-Cement Sheets make a completely weather-tight enclosure—give permanent protection to men and equipment.

And, despite the fact that the tower is exposed to the elements, maintenance will never be a problem. For in addition to resisting weather, "Century" Asbestos Corrugated *can not burn, rot, or rust*—rodents and termites can't hurt it. It doesn't even need protective painting to preserve it. Consider the maintenance costs these characteristics save!

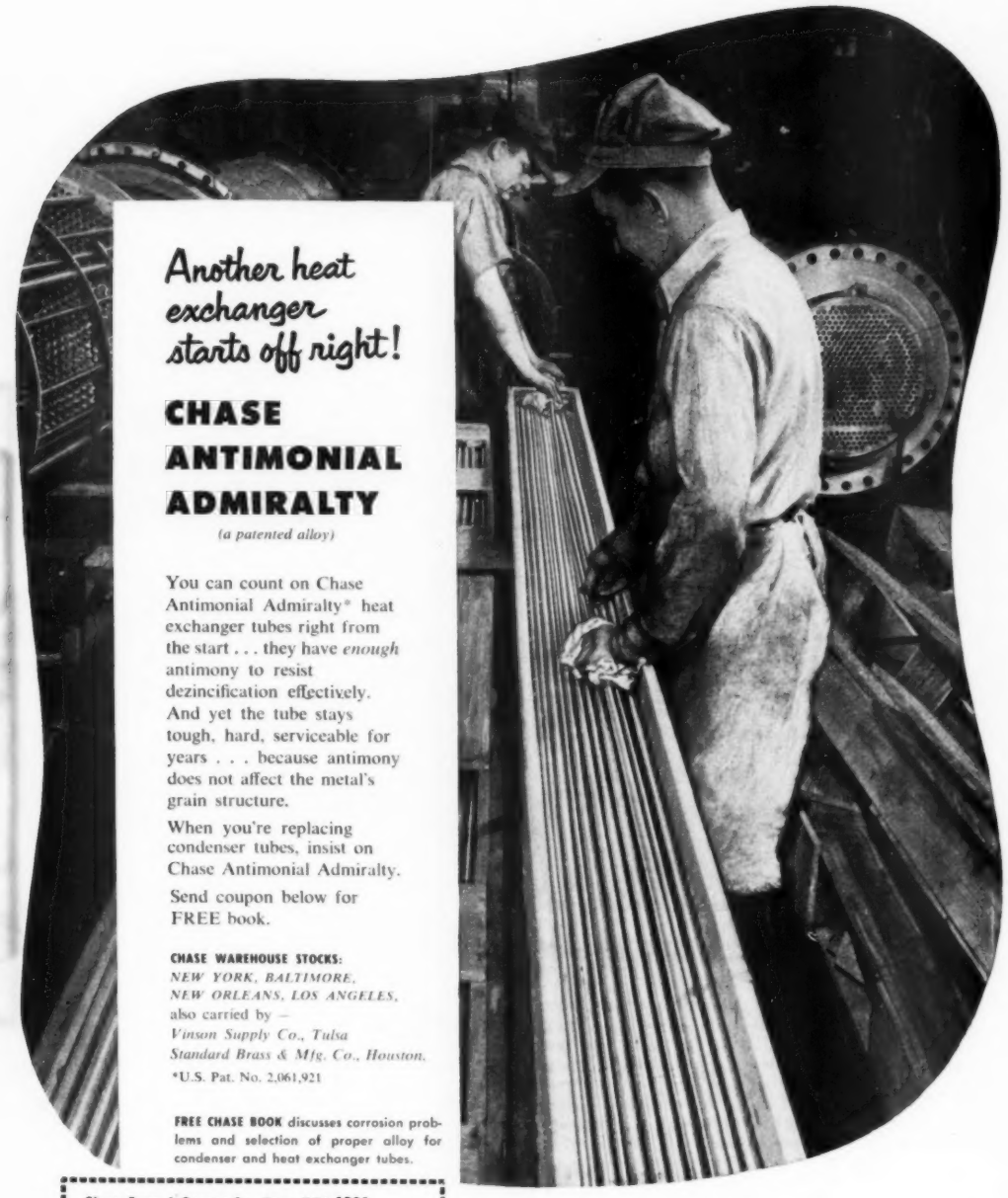
"Century" Asbestos Corrugated can be applied quickly, easily, inexpensively. The large-size sheets are exceptionally strong, but they can be cut and drilled with ordinary working tools—can be fastened in place with a minimum of labor.

Whatever your building plans—new construction, expansion, or modernization—it will pay you to consider cost-saving "Century" Corrugated Asbestos-Cement Sheets for both siding and roofing. We'll be glad to send complete details on request.

Nature made Asbestos . . .
Keasbey & Mattison
has made it serve mankind since 1873

K&M Cast in asbestos

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA



Another heat exchanger starts off right!

CHASE ANTIMONIAL ADMIRALTY

(a patented alloy)

You can count on Chase Antimonial Admiralty* heat exchanger tubes right from the start . . . they have *enough* antimony to resist dezincification effectively. And yet the tube stays tough, hard, serviceable for years . . . because antimony does not affect the metal's grain structure.

When you're replacing condenser tubes, insist on Chase Antimonial Admiralty.

Send coupon below for FREE book.

CHASE WAREHOUSE STOCKS:
NEW YORK, BALTIMORE, NEW ORLEANS, LOS ANGELES, also carried by —
Vinson Supply Co., Tulsa
Standard Brass & Mfg. Co., Houston.

*U.S. Pat. No. 2,061,921

FREE CHASE BOOK discusses corrosion problems and selection of proper alloy for condenser and heat exchanger tubes.

Chase Brass & Copper Co., Dept. OGJ 1251
Waterbury 20, Conn.

Please send me Free Book on Condenser and Heat Exchanger Tubes.

NAME_____

POSITION_____

FIRM_____

STREET_____

CITY_____ STATE_____

Chase BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

• *The Nation's Headquarters for Brass & Copper*

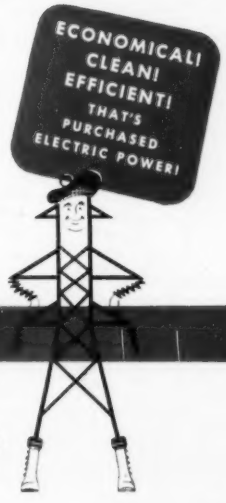
Albany† Atlanta Baltimore Boston Chicago Cincinnati Cleveland Dallas Denver† Detroit Houston† Indianapolis Kansas City, Mo. Los Angeles Milwaukee Minneapolis Newark New Orleans New York Philadelphia Pittsburgh Providence Rochester† St. Louis San Francisco Seattle Waterbury

(†sales office only)

CHASE 75th ANNIVERSARY 1876 1951

IT'S POWERED BY *Electric Power*

This clean, modern pipe line terminal near Houston, Texas, is another example of PURCHASED Electric Power efficiency and economy. Hundreds of similar installations now help to keep the nation's expanding pipe line systems operating with less manpower and at lower costs during these inflationary times. While there's a chance to save thousands — perhaps millions of dollars — don't decide until you have fully investigated the more efficient, low cost advantages of PURCHASED Electric Power!



Petroleum Electric Power Association

ORGANIZED IN THE INTEREST OF GREATER SERVICE TO THE PETROLEUM INDUSTRY

CALL YOUR NEAREST ELECTRIC SERVICE COMPANY FOR MORE FACTS

OR ADDRESS YOUR REQUEST TO P. O. BOX 2771, DALLAS, TEXAS

Pick The Make That Lets YOU Pick

exactly the design you need

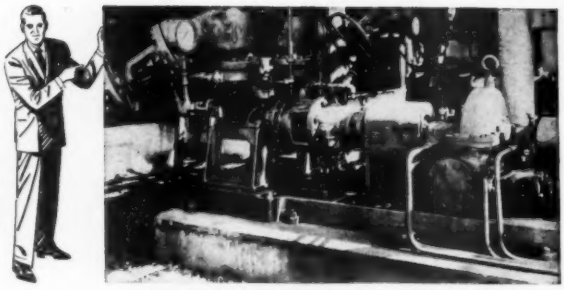
Worthington has a centrifugal pump for practically any conceivable refinery requirement—in the most complete range of sizes.

The pictures here show only a few of the many purposes served by Worthington Centrifugals. Whether your problem is high temperatures . . . volatile liquids . . . abrasives . . . acids . . . or any of the host of others that harass refineries — the Worthington line includes the one best pump for the job.

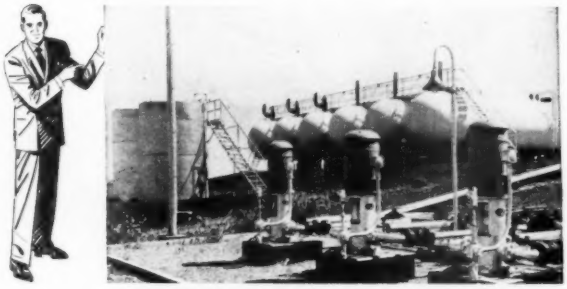
Further assurance you enjoy when you standardize on Worthington: you know that Worthington, making the broadest line of pumps, will recommend the best type for each job—you know you'll benefit from *engineering* that's the finest in the business—and you know you can depend on *service* that does its best to keep you in peak production.

Write us for bulletins on the types in which you're interested and see why *there's more worth in Worthington*. Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.

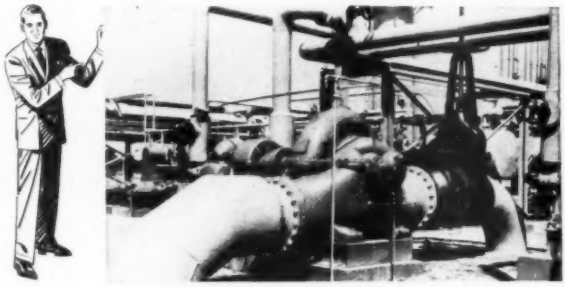
SEE OUR CATALOG IN SWEET'S



WORTHINGTON HR CENTRIFUGAL, shown at Sun Oil Co., Marcus Hook, Pa., is typical of pumps used in distillation, cracking and treating petroleum products.



WORTHINGTON QER VERTICAL centrifugal process pump, shown at Magnolia Petroleum Company, Chitwood, Oklahoma, is used to transfer propane, butane and LPG.



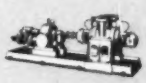
WORTHINGTON LA CENTRIFUGAL, turbine-driven, shown at Carthage Corporation plant, Carthage, Texas, is typical of cooling tower and general service pumps.

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB

WORTHINGTON

C.1.4

Types HR and HB Capacities to 1800 gpm. Heads to 900 ft. Temperatures from far below zero to 800 F. Pressures from high vacuum to 750 lb. gauge.



Type HD Hydraulically-balanced, double-suction impeller handles boiling liquids with low submergence. 600 to 3200 gpm. Heads to 700 ft, temperatures to 850 F, pressures to 350 lb.

Type CNE For loading or transfer service. Capacities to 1500 gpm. Heads to 500 ft.

Type HM Available in 12 sizes. Capacities to 700 gpm. Heads to 450 ft. Maximum temperatures 500 F.

RESISTS HOT ACETIC ACID and CHLORIDE VAPORS

AT 158 TO 284 DEG. F.

HASTELLOY alloy expansion joint

This HASTELLOY alloy C expansion joint is constantly exposed to acetic acid vapors saturated with acetyl chloride and containing small amounts of chloracetic acid. Alloy C is practically unaffected by these corrosive vapors at temperatures of 158 to 284 deg. F. Used at the top of a 24-foot distillation still, the joint is also elastic enough to compensate for the almost half-inch growth of the heated tower.

HASTELLOY alloy C and the other two grades of this nickel-base alloy—alloys B and D—are excellent construction materials for all types of processing equipment that must resist corrosive attack. In addition to their unusual corrosion resistance, alloys B and C have high mechanical strength and are available in both cast and wrought forms. Alloy D is available in cast form only. All three alloys are readily fabricated by most common methods. Fill out the handy coupon below for the whole story on these alloys.

"Haynes" and "Hastelloy" are trade-marks of Union Carbide and Carbon Corporation.

HAYNES Trade-Mark *Alloys*

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC

USE THIS HANDY COUPON

Haynes Stellite Company, 725 So. Lindsay Street, Kokomo, Indiana

Please send me the new edition of your booklet, "HASTELLOY High-Strength, Nickel-Base, Corrosion-Resistant Alloys."

NAME_____

COMPANY_____

ADDRESS_____

Drills cores, pares costs with help of TIMKEN® bearings

THERE'S no chance of the core being ground up by the rotating tube in this Double-Tube Core Barrel, built by Jones Core Drilling Company. A bearing assembly between the two tubes permits the inner barrel, in contact with the core, to remain stationary, while the outer barrel revolves to drive the bit.

Timken® tapered roller bearings in the bearing assembly carry the thrust of the core pushing up through the inner barrel and keep the inner barrel rigid at all times. They also cut maintenance costs, reduce wear and insure long life.

Due to their tapered construction, Timken bearings carry both radial and thrust loads in any combination. Line contact between rollers and races of Timken bearings permits extra load-carrying capacity. True rolling motion and incredibly smooth surface finish of Timken bearings reduce friction to a minimum.

Because they keep housing and shaft concentric, Timken bearings make closures more effective. Dirt and dust are kept out; lubricant kept in. Lubrication time and maintenance are cut to a minimum. Since Timken bearings are made of Timken fine alloy steel, case-hardened for maximum wear resistance, and engineered for the job, they normally last the life of the machine.

If you're looking for low-cost, dependable performance, be sure to specify Timken bearings for the machinery you buy or build. Look for the trade-mark "Timken" on the bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

WE MAKE OUR OWN STEEL

The special grade alloy steel which gives Timken bearings their strength and resistance to wear is made in our own steel mills.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST ▯ LOADS OR ANY COMBINATION ✳

Which do YOU need to protect YOUR business from FIRE?

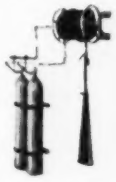
Kidde Multi-Jet Nozzle. The "business end" of a Kidde CO_2 fire extinguishing system. It blankets flame with fire-smothering carbon dioxide.

Kidde Dry Chemical Wheeled Extinguisher. A "one man fire engine" to control large fires in flammable liquids, live electrical equipment.

Kidde "Heat Detector". 24 hours a day this sensitive detector stands guard ready to set off a Kidde CO_2 system automatically if fire should strike.

Kidde Carbon Dioxide Portable. Fast-acting...easy to use. A pull of the trigger releases a rolling fog of CO_2 gas that smothers flame instantly.

Kidde Smoke Detector. A new development in industrial fire fighting. Detects hidden smoldering fire, tells in which room or vault it is located.



Kidde CO_2 Hose Reel Equipment. Combines the convenience of a portable fire extinguisher with the great fire-killing power of a built-in system.

Kidde Trailer. An economical, fast-acting unit for thorough-going fire protection in smaller plants and airports and auxiliary protection in larger ones.

Kidde Chemical Extinguishers. Foam, Soda-acid or water portable extinguishers in stainless steel. Two-and-a-half gallon capacity. Easy to use, reliable, economical.

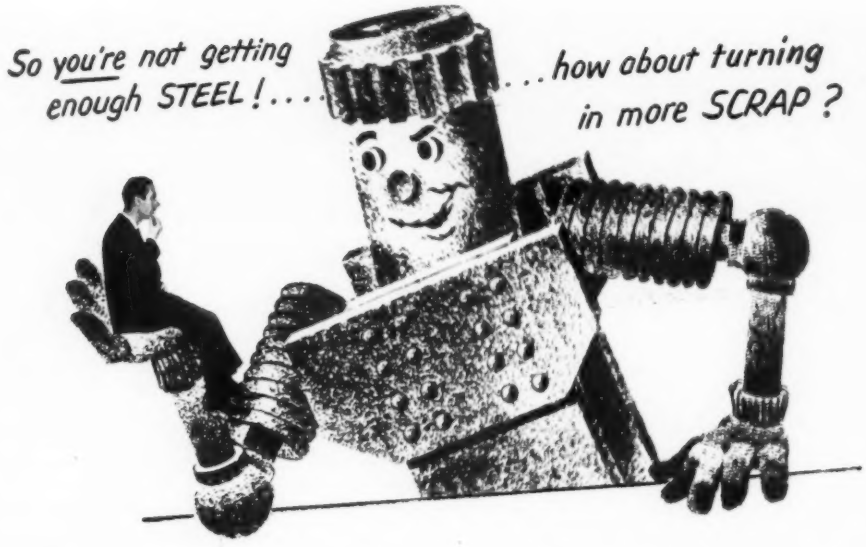
Kidde Vaporizing Liquid Extinguisher. Approved for fires in flammable liquids and electrical equipment. Discharges carbon tetrachloride.

For many years Walter Kidde & Company, Inc. has specialized in fire extinguishing equipment. It ranges from 2½ pound portables to huge built-in systems. Need advice on protection for your plant? Call or write Kidde.

Kidde

Walter Kidde & Company, Inc., 1254 Main Street, Belleville 9, N. J.

Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.



There's only one quick way to get more steel!

...get more SCRAP to the mills, at once

LET'S be realistic about the scrap shortage. The need for scrap is desperate. It threatens to hamper our whole National Defense effort—and it vitally concerns *you* because it boils down to this:

Unless 100,000 tons of industrial scrap roll into the steel mills every day, steel production will drop, and there'll be *less* steel for everyone—you included.

On the other hand, if more scrap is turned in, more steel will be turned out—and the more steel that's made the more steel *you'll* get.

So—if you want more steel—do your full share in getting your scrap back to the mills. Comb through your plant, again and again. Tap every source of dormant scrap. Dig out every retired machine that you can possibly spare and rush it to your scrap dealer. Rip out any old rails and switches that are rusting away on unused sidings—and scrap them. Scrap your antiquated dies, jigs and fixtures, your worn-out tanks and boilers that are gathering dust in some forgotten corner. Make sure that not a single pound of scrap is by-passed. Sell it—ship it. It means good money for you, more scrap for the Nation's scrap pile, and more steel for *everyone*.

• • •

Remember—the Nation's productive effort depends primarily on steel—and steel depends on SCRAP . . . *your* scrap. Turn it in—NOW.

You'll find your local scrap dealers listed in the yellow pages of the phone directory.

This page would ordinarily be used to tell you about

AMERICAN TIGER BRAND WIRE ROPE

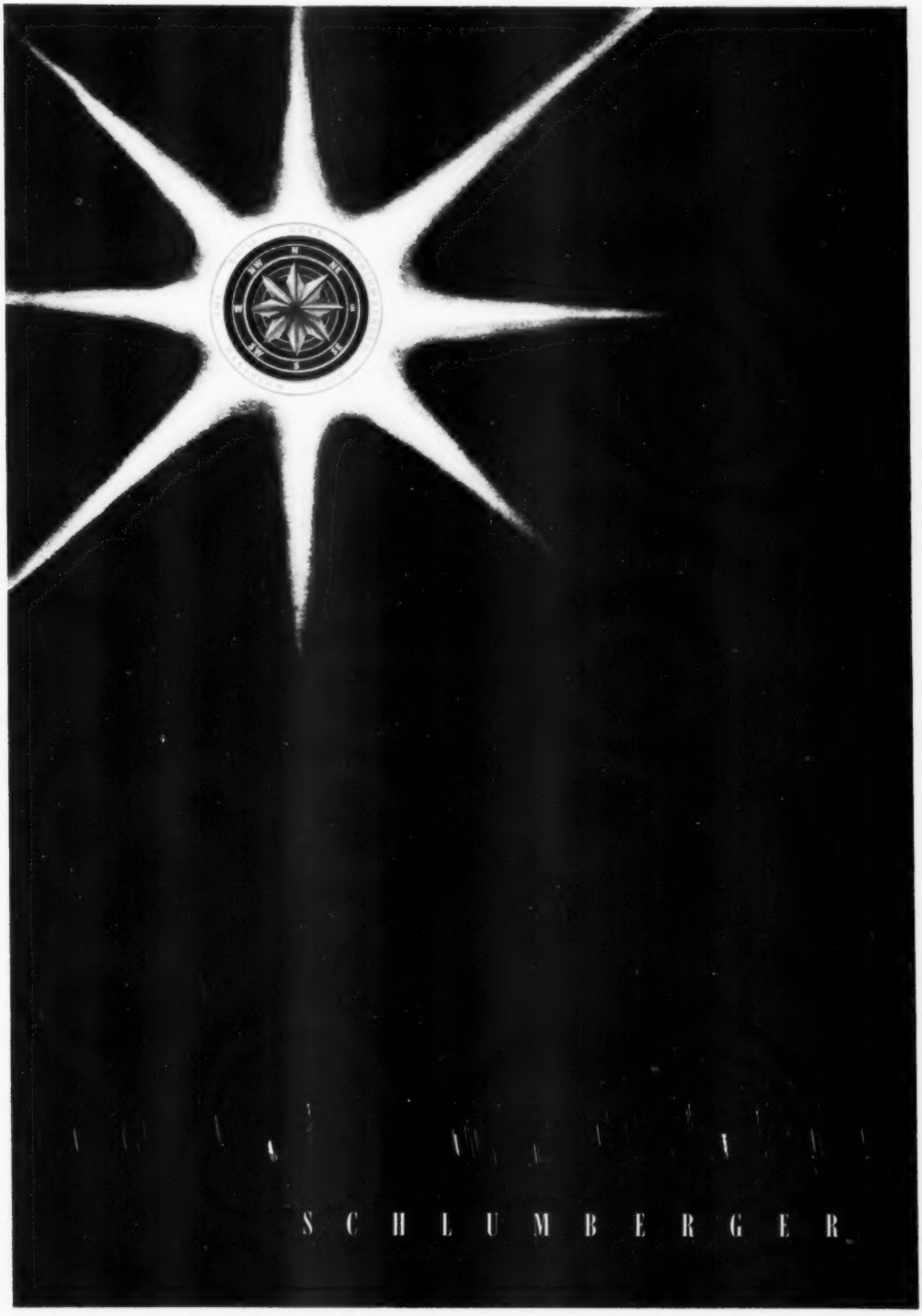
but, because without SCRAP we cannot produce steel, we are asking instead for your all-out help in getting more SCRAP to the mills.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

1-1902

UNITED STATES STEEL


SCHLUMBERGER

in WIRE ROPE, too specialized use calls for the RIGHT KIND of muscle

Tough, wiry muscles stand the Rocky Mountain Bighorn in good stead; give him the sure-footed agility he must have to survive on almost impassable heights.

In wire rope, too, the right kind of muscle is mighty important... because different uses present different problems of wear and tear. Bending fatigue. Abrasion. Shock stress. Load strain. Each requires wire rope with the right construction and lay; the right grade of steel and size of wire to best withstand the destructive forces encountered.

Complete quality control from ore to finished rope; long experience and specialized know-how—these are your assurance that in Wickwire Rope you always get the proper combination of physical properties for long-lasting, reliable service on your particular job.

LOOK FOR THE YELLOW TRIANGLE ON THE REEL

THE COLORADO FUEL & IRON CORPORATION — Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
THE CALIFORNIA WIRE CLOTH CORPORATION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION — Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New York • Philadelphia

WICKWIRE ROPE

CF&I

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL & IRON CORPORATION

They Say—

Middle East's Importance

"Control over the Middle East's oil resources is a tremendous asset to the free world.

"Middle East oil now makes up half of the total amount of oil moving in international trade. It furnishes Europe, most of Africa, and Asia with the bulk of their petroleum needs. Within a few years it will supply nearly all of the oil needs of the Eastern Hemisphere. In addition, sizable quantities of Middle East oil could move to the Western Hemisphere to help meet our increasing requirements.

"If this flow should be stopped or seriously curtailed, the Western Hemisphere would be faced with the problem of supplying almost the entire petroleum needs of the free world. Such a task, even on a much reduced scale, could not be accomplished without a tremendous effort involving almost immediate and stringent rationing throughout the free world and, over the long run, huge new investments to create the required additions to the producing and refining potential.

"The oil of the Middle East is indeed essential to the continued security and well-being of the whole free world."

Walter J. Levy, consultant, addressing Export Managers' Club of New York.

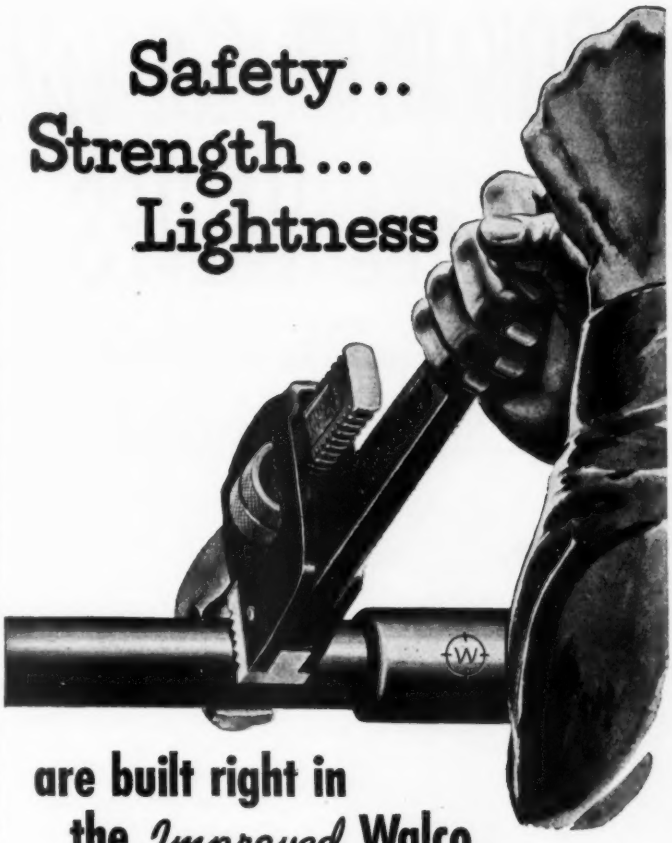
Fizz Water Comment

Sir:

I have read the report of Mr. Kenneth B. Barnes on "Fizz Water Fizzles," carried in your November 1, 1951 edition, with great interest. I feel that some discussion of Mr. Barnes' report may serve a good purpose in calling attention to the fact that certain of the results described by him are not at all surprising, and, as a matter of fact, were to be expected.

The statement that "carbon dioxide in water flooding doesn't obtain additional oil recovery" is not supported by a vast amount of experimental and field data, and certainly should be qualified by reference specifically to the work of the Penn Grade Crude Oil Association. It is proper to emphasize that negative results as well as positive results have been obtained in the laboratory from the use of carbon dioxide in water-flooding experiments. Thus, it is not at all surprising that the limited number of tests performed by the Pennsylvania Grade Crude Oil Association have not been successful in showing any substantial improvement in oil recovery. Since literally

Safety...
Strength...
Lightness



are built right in
the *Improved* Walco

Walco, the strongest pipe wrench on the market today, is also the safest – and lightest all-steel wrench available. Why? Because welding – with all its inherent strength, safety and weight-reduction advantages – has been used to join the Improved Walco's housing and handle into one integral unit . . . a unit that makes the Walco so rugged that all tests show it far exceeds the requirements set up by Federal Specification GGG-651a for Type II Heavy Duty Adjustable Pipe Wrenches.

The jaws of the Improved Walco are carefully machined and will not slip: even severe abuse will not spoil the wrench's grip or quick biting action. A flexible, double-acting, quickly replaceable spring – an Improved Walco feature for which patent is pending – gives the wrench fast, positive ratcheting action. Adjustment is easy – the nut may be spun with the palm of the hand. The proper wrench opening can be determined by a calibrated pipe scale on the movable jaw.

Ask your Walworth Distributor to show you the Improved Walco – the strongest-made and longest-lived pipe wrench on the market today. Buy it – you will save money in the long run.

WALWORTH

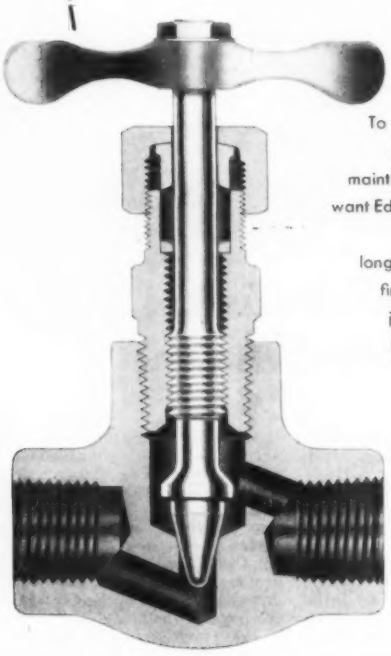
valves • fittings • pipe wrenches

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

LOOK INTO *Edward* STEEL VALVES

For Design Features That Keep Costs LOW—Performance HIGH



To get gage valve service that is free of down-time and costly maintenance, look to Edward. You'll want Edward forged steel gage valve bodies for added strength; long-taper, semi-needle stem for fine regulation and wide seat joint for tight seating; tapered, threaded body-bonnet joint to keep bonnet tight; and bonnet and packing nut plated to reduce galling and corrosion. Get the full story on Edward gage valves in catalog 104. Send for a copy.

EDWARD 152-152J GAGE VALVES—female both ends in sizes ⅛"-1" or male inlet and female outlet in ½" size. Globe or angle in three metals—carbon steel; all parts 13% chrome stainless steel; or all parts 18-8 stainless steel. Conservatively rated at 4,000 lb sp at 150 F, or 600 lb sp at 750 F.

A Product of Edward Valves, Inc., 145th Street, East Chicago, Indiana.

FIG. No. 152J

Edward Valves, Inc.

Subsidiary of ROCKWELL MANUFACTURING COMPANY

EAST CHICAGO, INDIANA

hundreds of flooding tests were required to determine the proper application of carbon dioxide to the recovery of oil, it is not difficult to understand why only two series of flooding tests could produce negative results.

The writer has believed for several years that the Venango sand series, where water saturations are generally so high that artificial injection of water cannot be applied successfully, would not react favorably to the use of carbon dioxide. For this reason, no recommendation has been made for the use of carbon dioxide in these rocks, and the results obtained by the Penn Grade Association, therefore, are in agreement with our own beliefs. . . . In contrast, laboratory flooding tests with carbon dioxide on samples of genuine Bradford sand have yielded such promising results that an Orco flooding test is being undertaken in that field.

It is not believed that the results of the Penn Grade tests are contradictory to the conclusion reported repeatedly by Mr. James W. Martin that under certain conditions of temperature, pressure, crude oil composition, and reservoir characteristics the use of carbonated water will result in a recovery of oil that is superior to . . . . conventional flooding with plain water.

Paul D. Torrey, general partner
Oil Recovery Chemicals
Austin, Tex.

Editor's note.—The Journal is sure the industry will be interested in the above letter of oil-recovery expert Paul D. Torrey, which calls particular attention to the fact that the new carbon dioxide repressuring process may not work with certain oil sands but will with others, as indicated by laboratory tests.

The Journal this year has published several papers on the carbon dioxide, or so-called Orco method (August 30, page 70; May 3, page 53; and January 25, page 171).

Mr. Torrey, in his letter mentions an actual field Orco flooding test now under way in the Bradford sand territory. Results of this work are now available and an article by James W. Martin of Oil Recovery Corp. giving production data will appear in a Journal issue later this month.

Converting the Bolivar

Sir:

I observe in the November 15 issue *(See "Creole to Spend More in '52," The Oil and Gas Journal, November 15, 1951, page 124)* that Creole invested Bs. 175,000,000 (roughly $525,000,000) during the current year in plants and equipment.

. . . I drilled some of the initial wells in that country and was there when the first gusher came in, the notorious Larosa-Cabimos well, and also drilled the initial well at Camiri, Bolivia, also in Argentina, north around Tartagal, in the southwest in

Plaza Huincul with Standard of N. J.

Now when I was in South America the exchange in Venezuela was Bs. 4.80 to $1.00. Now you quote exchange B. 1.00 to $4.18. Shouldn't that be turned around? Since when are Bolivars more than dollars?

H. E. Speaker
Box 7
Canton, Kans.

Editor's Note: Reader Speaker is in the right direction! The official exchange rate is Bs. 3.35 to $1.00. Our slide rule slipped, and our writer multiplied instead of dividing when converting Bolivars to dollars.

CALENDAR

December

American Chemical Society, southwestern sections, seventh regional meeting, University of Texas, Austin, December 6-8.

Interstate Oil Compact Commission, annual meeting, Hotel Marion, Little Rock, Ark., December 11-12.

American Association for the Advancement of Science, annual meeting, Philadelphia, December 27-28.

1952 Meetings

January

Society of Automotive Engineers, annual meeting, Hotel Book-Cadillac, Detroit, January 14-18.

February

American Society for Testing Materials, Committee D-2 on petroleum products and lubricants, Shoreham Hotel, Washington, D. C., February 3-8.

Missouri Petroleum Association, annual convention and trade exhibit, Jefferson Hotel, St. Louis, February 4-6.

Instrument Society of America, New York Section, power-plant symposium, Hotel Statler, New York City, February 7-8.

American Petroleum Institute, Division of Marketing, lubrication-committee meeting, Hotel Book-Cadillac, Detroit, February 18-19.

Wisconsin Petroleum Association, twenty-sixth annual convention and equipment show, Milwaukee Auditorium, Milwaukee, February 26-27.

American Association of Petroleum Geologists, Rocky Mountain Section, annual meeting, Salt Lake City, February 28-29.

March

American Society for Testing Materials, spring meeting, Hotel Statler, Cleveland, March 3-7.

American Petroleum Institute, Division of Production, southwestern district, Washington-Youree Hotel, Shreveport, March 5-7.

National Association of Corrosion Engineers, eighth annual conference and exhibition, Galvez Hotel, Galveston, Tex., March 10-14.

American Institute of Chemical Engineers, regional meeting, Atlanta, March 16-19.

American Petroleum Institute, Division of Production, Mid-Continent district meeting, Broadview Hotel, Wichita, Kans., March 21.

American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, and Society of Exploration Geophysicists, joint annual meeting, Biltmore Hotel, Los Angeles, March 23-27.

Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, March 31-April 2.

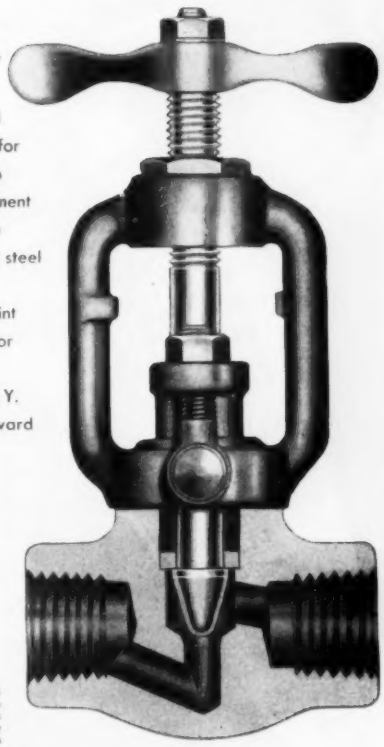
April

American Petroleum Institute, Division of Production, eastern district, Hotel William Penn, Pittsburgh, April 2-4.

LOOK INTO *Edward*

STEEL VALVES

For Design Features That Keep Costs LOW—Performance HIGH



Here is a heavy duty forged steel instrument valve ideal for limited spaces. You'll want to look into such Edward instrument valve design features as **no** bonnet joint to leak; forged steel body and yoke; simple to repack; tapered needle point stem with fine pitch thread for absolute regulation, swing bolted gland and O. S. and Y. For dimensions write for Edward catalog 104 now.

EDWARD 952-2952 INSTRUMENT VALVES

Conservatively rated at 6,000 lb WOG or 1,500 lb sp at 1000 F. Carbon steel or 13% chromium stainless steel bodies. Globe and angle—screwed or socket welding ends. Integral and swivel type disc plug. Sizes ¼-1 inch.

Fig. 2952-53 Series have swivel disk with Stellite in larger sizes

A Product of Edward Valves, Inc., 145th Street, East Chicago, Indiana.

Edward Valves, Inc.

Subsidiary of ROCKWELL MANUFACTURING COMPANY

EAST CHICAGO, INDIANA

WILLSON
Heavy Duty
Cup Goggles
keep you on the safe side
STYLE RR 50
WILLSON SAFETY GOGGLES
WILLSON COMFORT FEATURES KEEP THEM IN USE
Molded Eye Cups Fit Facial Contours • Adjustable Bridge Width for Proper Fit • Side Screens Ventilated to Minimize Fogging • Adjustable Headband—Secure Fit Without Pressure • Fitted with Super-Tough® Hardened Glass or Plas-Tough® Plastic Lenses
OTHER WILLSON HEAVY DUTY GOGGLES
Cover-All® over glasses
Rubber Mask splashing liquids
®Trade Mark

See your Willson distributor or write for bulletin

WILLSON PRODUCTS, Inc., 204 Washington St., Reading, Pennsylvania

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, April 8-10.

American Institute of Electrical Engineers, District 7 meeting, Hotel Jefferson, St. Louis, April 15-17.

American Petroleum Institute, Division of Transportation, pipe-line conference, Blackstone Hotel, Fort Worth, April 21-23.

American Petroleum Institute, Division of Production, Rocky Mountain district, Gladstone Hotel, Casper, Wyo., April 24-25.

Southern Gas Association, annual convention, Galveston, Tex., April 28-30.

American Institute of Electrical Engineers, District 1 meeting, Binghampton, N. Y., April 30-May 2.

Natural Gasoline Association of America, annual meeting, Rice Hotel, Houston, April 30-May 3.

May

American Geophysical Union, thirty-third annual meeting, National Academy of Sciences, National Research Council, Washington, D. C., May 5-7.

American Institute of Chemical Engineers, regional meeting, French Lick, Ind., May 11-14.

American Association of Petroleum Geologists, regional meeting, Mayo Hotel, Tulsa, May 12-13.

American Gas Association, Natural Gas Department, spring meeting, Biltmore Hotel, Los Angeles, May 12-13.

American Petroleum Institute, Division of Refining, seventeenth midyear meeting, San Francisco, May 12-15.

American Petroleum Institute, Division of Production, Pacific Coast district, Biltmore Hotel, Los Angeles, May 15-16.

American Petroleum Institute, Division of Marketing, midyear meeting, Copley Plaza Hotel, Boston, May 19-20.

Gas Appliance Manufacturers Association, annual meeting, Broadmoor Hotel, Colorado Springs, Colo., May 21-23.

American Gas Association, production and chemical conference, Hotel New Yorker, New York, May 26-28.

Society of Exploration Geophysicists, Gulf Coast regional meeting, Rice Hotel, Houston, May 29-30.

June

Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh, June 5-6.

Canadian Gas Association, Chateau Frontenac, Quebec, June 8-12.

American Petroleum Institute, midyear standardization meeting, Brown Palace Hotel, Denver, June 9-14.

Petroleum Equipment Suppliers Association, Mark Hopkins Hotel, San Francisco, June 22-25.

American Society for Testing Materials, annual meeting, Hotel Statler, New York, June 23-27.

American Institute of Electrical Engineers, summer general meeting, Hotel Statler, New York City, June 23-27.

September

American Institute of Chemical Engineers, regional meeting, Palmer House, Chicago, September 11-13.

American Association of Oilwell Drilling Contractors, annual meeting, Skirvin Hotel, Oklahoma City, September 28-30.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

W&T altimeters-- the Shortcut UP THE MOUNTAIN

In these days of rising costs, it need not be expensive to determine ground elevations — just use the shortcut — **ALTIMETER SURVEYING** with W&T Altimeters.

Here are some of their features:

SELF-BALANCING PRINCIPLE — No adjustment or setting is required and the altimeter is always in balance with the atmosphere and ready to read. There is no lag.

CALIBRATION — Scales are individually drawn for each mechanism and require no correction. Graduations are spaced for easy readability and not so fine as to cause confusion.

RANGE — Ranges of 2,000 feet, 7,000 feet, and 15,000 feet are standard. Special ranges are available to order.

DURABILITY — The mechanism is simple and free of intricate design features. It is shock-proofed in the instrument case.

PERFORMANCE — W&T Altimeters rival the accuracy of the finest laboratory standards for measuring pressure — their performance is guaranteed.

To find out more about faster and cheaper field surveys, write today, without obligation, for the latest technical literature.

A-84

WALLACE & TIERNAN
PRODUCTS, INC.
ELECTRICAL MECHANISMS AND PRECISION INSTRUMENTS
Belleville 9, New Jersey • Represented in Principal Cities

BUILT TOUGH
To Take Plenty of Punishment!

NORRIS "ROYAL" Solid Type HAMMER HEAD SUCKER ROD WRENCH . . .

Drop-Forged Alloy Steel, Machined and Hardened Jaw, Perfect Balance

NORRIS "BUMP-UP" Hinged Type SUCKER ROD WRENCH . . .

AT YOUR FAVORITE SUPPLY STORE

Norris Brothers, INC.
ROBINSON · ILLINOIS

GUARD

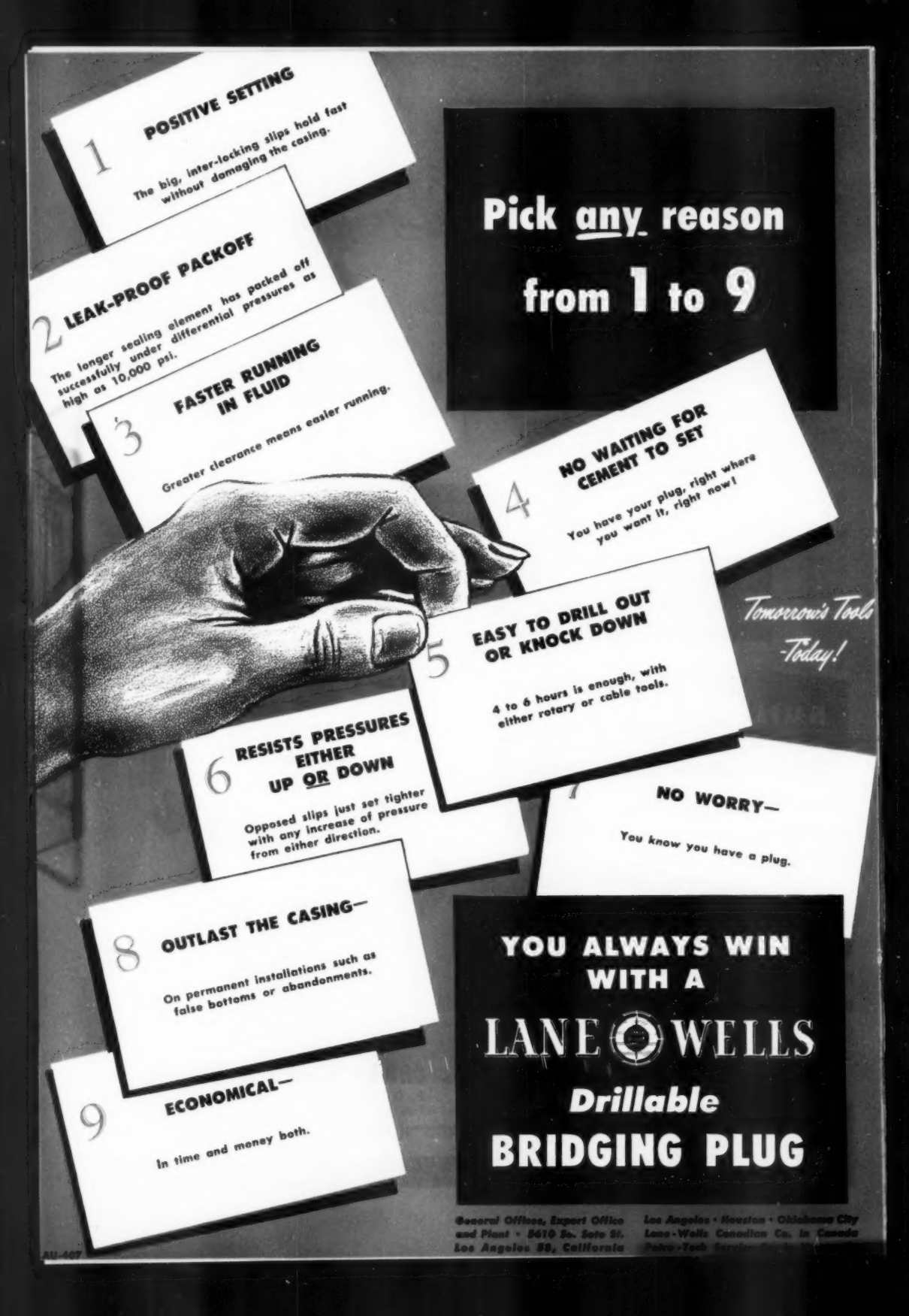
AGAINST DAMAGE TO PUMPS, ROTARY HOSE, AND MANIFOLDS CAUSED BY EXCESSIVE PUMP PRESSURES

Cameron

SHEAR RELIEF VALVE

Available in 2" and 3" sizes, and a wide range of relieving pressures, for all pump services.

CAMERON IRON WORKS INC.
P. O. BOX 1212 • HOUSTON, TEXAS
EXPORT: 74 TRINITY PLACE, NEW YORK, N. Y.
Represented in sterling area by: British Oilfield Equipment Co., Ltd., Duke's Court, St. James's, London, S.W.1, England


1 POSITIVE SETTING
The big, inter-locking slips hold fast without damaging the casing.
2 LEAK-PROOF PACKOFF
The longer sealing element has packed off successfully under differential pressures as high as 10,000 psi.
3 FASTER RUNNING IN FLUID
Greater clearance means easier running.
Pick any reason from 1 to 9
4 NO WAITING FOR CEMENT TO SET
You have your plug, right where you want it, right now!
Tomorrow's Tools -Today!
5 EASY TO DRILL OUT OR KNOCK DOWN
4 to 6 hours is enough, with either rotary or cable tools.
6 RESISTS PRESSURES EITHER UP OR DOWN
Opposed slips just set tighter with any increase of pressure from either direction.
7 NO WORRY—
You know you have a plug.
8 OUTLAST THE CASING—
On permanent installations such as false bottoms or abandonments.
9 ECONOMICAL—
In time and money both.
YOU ALWAYS WIN WITH A
LANE WELLS
Drillable
BRIDGING PLUG
General Offices, Export Office and Plant • 5610 So. Soto St. Los Angeles 58, California
Los Angeles • Houston • Oklahoma City
Lane-Wells Canadian Co. in Canada
AU-407

Published every Thursday by The Petroleum Publishing Co., 211 S. Cheyenne, Tulsa, Oklahoma. Founded in 1902. Name changed to The Oil and Gas Journal in 1910 by Patrick C. Boyle.

P. C. LAUINGER
President

S. H. ROURKE
Executive Vice President

HANSON B. PIGMAN
Circulation Manager

ADVERTISING
MITCHELL TUCKER
Vice President

New York Office
500 Fifth Avenue, Phone LOngacre 4-1750
CHARLES A. WARDLEY
Eastern Manager
ROBERT N. CAIRD, JR
Representative

Chicago Office
105 West Madison, Phone Central 6-2537
C. R. FARMER
Manager
E. S. KLAPPENBACH
Representative

Pittsburgh Office
429 Fourth Ave., Phone Atlantic 1-4835
ALFRED M. JONES
Manager

Tulsa Office
211 S. Cheyenne, Phone 3-6291
JOHN D. REILLY
Mid-Continent Manager
J. PARKER HOLLAND
Production Manager

Houston Office
Sterling Building, Phone Charter 4626
JOHN M. SPEARS
Gulf Coast Representative

Los Angeles Office
650 S. Grand Ave., Phone Vandike 0722
DONALD O. HANSON
Manager

England Office
111 Thorley Lane, Timperley, Cheshire
HARRY BECKER
European Representative
Phone Ringway 4702

Subscription rate to the petroleum industry, United States and foreign, 1 year, $3.00. Single copies, 50 cents. Back copies when over a year old, one dollar. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1951 by The Petroleum Publishing Co.

Member
ABC Audit Bureau of Circulations
Associated Business Papers
ABP

JOURNALLY Speaking

"You people are drilling too darn deep!"

Change of Pace

THE cartoon on this page is not just to fill up space so we won't have to write so much (though in this department that would be a highly desirable objective). The purpose is to introduce a new feature.

For quite a while the Big Yellow Book has been running one cartoon every week, tucked away rather inconspicuously toward the back. So far no readers have complained that it lowered our editorial dignity nor detracted from the technical value of our high-powered engineering articles. On the contrary, most of our readers seem to rather like the idea.

So we decided to go a little further and purchase the brain children of some other cartoonists. So from now on, from time to time, and as space permits, you will find such presumably humorous sketches scattered around through the magazine. We hasten to warn that these cartoons have nothing to do with any articles which may be on the same page. They are what editors call "wild art," and some of the cartoons, as you will see, are very, very wild indeed.

Cradle to Grave

FREQUENTLY our loving friends send snapshots of their babies cutting their teeth on a copy of our favorite oil publication and the other day we got a subscription renewal from Ira L. North, of Rising Sun, Ind., who said he is 91 years old but can't get out of the habit of reading the Big Yellow Book every week. This undoubtedly makes him our oldest reader. Anyone have evidence to dispute it?

L.P.G. Ham

THE petroleum age has been responsible for innumerable changes in our way of life and the passing of many an old tradition and institution, and now we read that L.P.G. is about to relegate the old smokehouse to the land of limbo. A recent article on curing meat says that a new method of smoking hams utilizes propane gas to burn sawdust, with completely automatic controls, in such a way as to reduce shrinkage and increase the moisture content of the meat. Mandy, will you-all carve me another slice of that juicy southern propane ham?

Boron From Within

THE oil industry, we are informed by Washington, is going to have to use a lot of steel alloyed with boron instead of the more familiar alloys which are now in high demand for defense uses. We are told that there is plenty of boron and that only a pinch or so is needed per ton of steel, since an ounce of the stuff will replace 20 lb. of the critical alloying materials. The main trouble, it seems, is in spreading the minute amounts of this hardening material throughout a melt of steel. The best carriers found so far are the very alloy materials that are the scarcest, so it looks like the steel makers are in a vicious circle.

Who Isn't?

THE Journal's subscription renewal blank has a line for the man to write in his title and another one headed "My company is ———." One superintendent filled out the latter: "Short of material." Having had his joke he then gave the name of his company. Good thing, too, because that information hardly would serve to identify any particular company these days.

Henry D. Ralph

Control

● Nothing takes the place of the Driller's know-how . . . but as an aid to know-how, the driller has the benefit of precision instruments and modern equipment, to *control* operations and assure successful, trouble-free completions.

Same thing applies to cement: The Burner, for example, with his long years of experience, has the most modern devices at his finger tips, to *control* his operation and assure the production of cements with the uniformly high quality that means trustworthy performance . . . cements that produce trouble free cementing jobs when the casing is swung into place.

LONE STAR CEMENT CORPORATION

Offices: DALLAS • HOUSTON • ABILENE, TEX.
NEW ORLEANS • BIRMINGHAM • KANSAS CITY, MO.
ALBANY, N. Y. • BETHLEHEM, PA. • BOSTON • CHICAGO
INDIANAPOLIS • NEW YORK • NORFOLK • PHILADELPHIA
RICHMOND • ST. LOUIS • WASHINGTON, D. C.

SELECT CEMENT TO FIT THE JOB

the OIL AND GAS JOURNAL

December 6, 1951

VOL. 50. NO. 31

EDITOR
C. O. WILLSON

MANAGING EDITOR
Kenneth B. Barnes

NEWS EDITOR
Henry D. Ralph

REFINING EDITOR
George H. Weber
500 Fifth Avenue, New York

INTERNATIONAL EDITOR
Dahl M. Duff
500 Fifth Avenue, New York

PIPE-LINE EDITOR
Paul Reed

TECHNICAL EDITOR
W. L. Nelson

ASSOCIATE EDITORS
Lynn M. Nichols
Neil Williams
R. B. Tuttle
Philip C. Ingalls
John C. Casper

DISTRICT EDITORS
D. H. Stormont
650 S. Grand, Los Angeles
Carl F. Hoot
Mercantile Bank Bldg., Dallas
Victor Lauriston
35 Stanley, Chatham, Ont
Bertram F. Linz
621 Albee Bldg., Washington
Walter Rose
Sterling Bldg., Houston
F. Lawrence Resen
Sterling Bldg., Houston
Ted A. Armstrong
211 S. Cheyenne, Tulsa
Joseph A. Kornfeld
211 S. Cheyenne, Tulsa
John C. Reidel
211 S. Cheyenne, Tulsa
William P. Sterne
211 S. Cheyenne, Tulsa
Robert J. Enright
211 S. Cheyenne, Tulsa
Roy F. Carlson
McClintic Bldg., Midland, Tex.

EDITORIAL ASSISTANTS
Polly DeArmond, Tulsa
Connie Farrar, Tulsa
Martha Allbright, Tulsa
Lucy Dee Owen, Houston

CORRESPONDENTS AT
Denver, Pittsburgh, Calgary, Columbus, Ashland, Ky., Oil City, Pa., and Mount Pleasant, Mich.

• NEWS FEATURES

Unions Ready to Kick Off Drive for 25-Cent General Wage Hike ... 67
Refiners Indicate Unions' More-Pay Demands to Be Strongly Opposed ... 67
Phillips Given Eleventh Chemical Engineering Achievement Award ... 68
Recovery and Utilization of Refinery Wastes Given More Attention ... 69
Ten Per Cent Gain in Oil-Burner Use in 1952 Seen by McIntosh ... 69
New Colorado Commission to Require Natural-Gas Conservation ... 70
Gulf Coast Petrochemical Projects This Year Involve $250,000,000 ... 71
Graphitization Not the Only Cause of Reactor Failures, Study Shows ... 72
Oil, Gas Pipe Lines to Get 641,599 Tons of Steel for First Quarter ... 74
Capehart Amendment Important in Obtaining Higher Crude Prices ... 74
New Price Base for Pipe Distributors Set Up to Fight Gray Market ... 75
PAD, NPA Cooperate to Relieve Threatened Additives Shortage ... 76
Uneasy PAD Queries 13,000 on Storage Capacity of L.P.G. Industry ... 76
Pipe-Procurement Rules Clarified for Drillers of 1 to 11 Wells ... 77
More Pacific-Area Oil Needs to Be Met by Gulf Coast Shipments ... 77
Three-Party Exploration Team Seeking Oil in Rub al Khali Desert Area ... 78
Anglo-Iranian Presents Its Case in Company Annual Report ... 80
International Petroleum Co. Makes Important Strike in Colombia ... 82
Standard-Vacuum Reaches Agreement to Build Refinery in India ... 82
Iran Ready to Sell Oil on Completion of "Necessary Formalities" ... 83

• ENGINEERING-OPERATING FEATURES

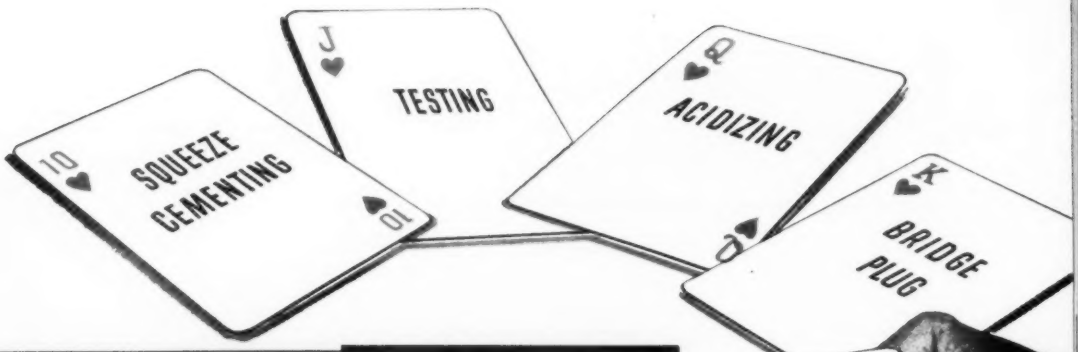
How 10 Control Problems Were Solved at Cities Service Plant ... 88
Priming Facilities for Unloading Crude Oil From Barges ... 88
Steam-Air Decoking of Furnaces ... 88
Compressor Suction Pressure-Loss Reduction ... 88
Surging of Sidestream Level Controllers ... 89
Removable Thermo-Welds and Protective Guards ... 89
Dual-Range Mercury Manometer Flow Meters ... 90
Mixers ... 90
Reducing Noise in Cat Cracking Unit ... 91
pH Control of Overhead Water Drawoff From Crude-Oil Units ... 91
Controlling Flow of 50° Baume Caustic ... 91
Device Aids Corrosion Study ... 92
That Spectacular Spraberry—A Symposium—Part 3:
Acid Flushing Fractures in Spraberry Sand ... 94
Reservoir Performance ... 97
History and Development of the Spraberry Trend ... 100
Stratigraphy and Structure of the Spraberry Trend ... 101
Principles of MicroLog Interpretation ... 102
Plantation's Big-Inch Expansion ... 107
Questions on Technology ... 110
Corrosion and Its Control—Corrosion Test Specimens ... 111
Engineering Fundamentals—Permeability Distribution and Flood History—1 ... 117
Refiner's Notebook—Calibration in Instrument Installation ... 119
Oil and Gas Equipment Digest ... 121

• EXPLORATION-DEVELOPMENT

A Dark Horse in the Rockies ... 139
Highlights of Week's Developments ... 139
Reports by Areas Start on Page ... 140

• REGULAR DEPARTMENTS

They Say ... 55
Calendar of Events ... 57
Journally Speaking ... 61
Editorial ... 65
This Week ... 66
Watching Washington ... 75
International News ... 78
Personals ... 84
Deaths in the Industry ... 87
Book Reviews ... 114
Natural-Gas News ... 125
Natural-Gasoline News ... 125
Pipe-Line News ... 127
Refining News ... 131
Construction Index ... 131
Drilling Contractors ... 135
Exploration Statistics ... 158
Production Statistics ... 159
Refining Statistics ... 160
Market Statistics ... 161
Equipment Men in News ... 162
Classified Advertising ... 164
Advertisers' Index ... 169



the right tool in the hole

There is no other tool you can use so effectively, so safely and so economically as the Baker Model "K" Cement Retainer (Product No. 400) for so many of the vital operations in your wells. It has truly proved a "lifesaver" for countless thousands of wells in such difficult work as squeeze cementing, testing, acidizing, or as a bridge plug—and it has even been used successfully to pick up and cement in position a lower section of a string of casing which had broken or backed-off.

SETS EASILY—HOLDS POSITIVELY The Baker Cement Retainer can be set accurately, readily and securely at any desired point. It maintains a leak-proof pack-off under any pressure which can safely be imposed on the casing, and permits placing cement, acid, or other fluids at any predetermined point behind the casing or liner; around the shoe joint; or into the open hole below.

READILY DRILLED UP Then, after the work has been successfully completed, the Baker Cement Retainer is quickly and easily drilled up, because the entire tool has been designed with a minimum cross-sectional area, so as to break up readily under the drilling bit—and construction of either Cast Iron or Magnesium Alloy further insures "drillability." Even the slips are segmented to break up readily into small, harmless fragments.

USED ALSO AS BRIDGE PLUG The Baker Cement Retainer can be converted into a casing bridge plug for setting on tubing, or better yet, on an electrical conductor cable. You can save wear and tear on precious tubing by calling your choice of the leading wire line service organizations—or ask any Baker representative or office for details.

BAKER OIL TOOLS, INC. HOUSTON • LOS ANGELES • NEW YORK

DON'T GAMBLE WITH THE MOST IMPORTANT WORK IN YOUR WELL—*USE THE "OLD RELIABLE"*

BAKER Model "K" CEMENT RETAINER

The Challenge of Spraberry

Underlying perhaps 3,000,000 acres in West Texas is the spectacular Spraberry sand, jestingly described as "the largest unrecoverable oil reserve in the world."

That characterization is only half humorous. Development has gone far enough to indicate that the Spraberry undoubtedly holds more crude oil than any field heretofore discovered in the United States. But how much of this oil will ultimately be brought to the surface is a serious question.

The Spraberry is a tight formation which yields its oil very slowly, but its most peculiar feature is the large vertical fractures which apparently run throughout the formation and make it about as unhomogeneous as a pile of loose bricks. The oil is believed to drain from the rock matrix into these cracks, and wells are good producers only when they tap the drainage from a fairly extensive system of fractures.

Therefore, the Spraberry presents an unusual challenge to the ingenuity of oil operators. Any drilling or completion method which plugs the fractures may reduce the yield of the well, so experiments are being made with air, oil, and special fluids as substitutes for conventional drilling muds, and some wells are being completed with cable tools. Various methods are employed to produce artificial channels in order to increase the drainage area.

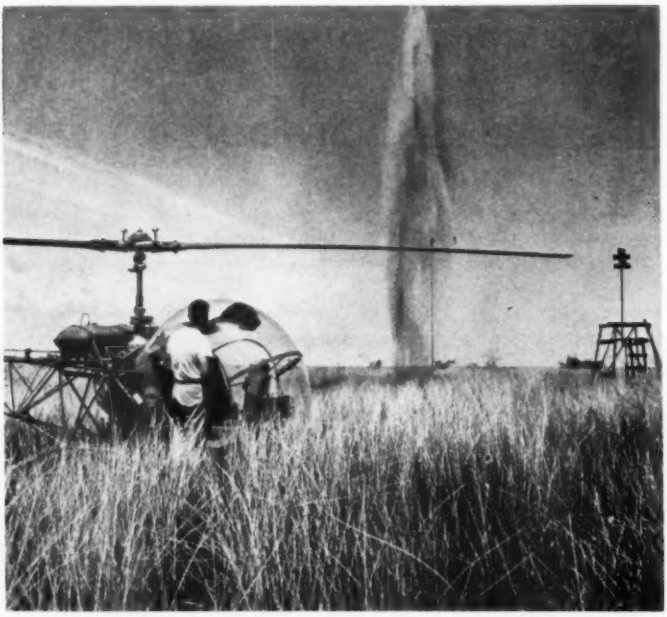
Beyond the completion methods, however, there is an even greater challenge, the long-range problem of maximum ultimate recovery. This is a problem which involves economics and statesmanship as well as engineering. Producing methods must take into consideration the channeling effects of the fractures, and it is believed that artificial gas pressure or water flooding would simply follow the cracks and bypass the bulk of the oil.

The proper spacing of wells in the Spraberry is currently a subject of argument. Some operators advocate wide spacing, at least until the reservoir's performance is better understood, to save steel and for both engineering and economic reasons. Others believe that close spacing is the only way to recover much of the oil in the long run and that the Spraberry is a quick source of oil needed immediately.

The optimum rate of producing Spraberry wells is equally perplexing. Some engineers hold that a very slow rate is essential to get maximum drainage from the matrix, while others theorize that a fairly rapid rate of gas expansion will force the most oil into the fractures, but nobody has seriously disputed the view of one high authority that perhaps no more than 10 per cent of the oil in place will be recovered by known methods.

Here is indeed a challenge to the oil industry—perhaps the largest single accumulation of oil on the continent with no economical method of recovering more than a fraction of it. Spraberry demonstrates that the industry daily faces new technical and operating problems in its constant task of converting latent natural resources into commercial supplies.

THIS WEEK



MARSH BEATER.—Down in the Louisiana Gulf Coast area where water and land are about equal in area, the helicopter is becoming a more and more important tool in exploration work. Faster than the lumbering swamp buggies, the helicopter can take men or equipment into remote, almost inaccessible areas in a hurry. Here a Shell Oil Co. helicopter sits in the foreground while mud and water erupt following a shot on the Marsh Island lease south of New Iberia. The machines are becoming increasingly useful in seismic surveys, speeding technical men to drilling wells, and in many other uses.

INTERNATIONAL.—International Petroleum Co. makes important wildcat strike in Colombia, 75 miles north of its former De Mares concession. . . . Well flows 550 bbl. through ½-in. choke in 12-hour test. . . . Gravity is 25°. . . . ¶Standard-Vacuum reaches agreement with Government of India on plans for 19,000-bbl. refinery near Bombay. . . . Other agreements between Indian and Caltex and Burmah-Shell now pending. . . . ¶Burma to acquire one-third interest in Burmah Oil Concessions operations in Burma under new agreement just reached. . . . British Government to lend Burma £2,500,000 to be used in purchase of shares. . . . ¶Glenn McCarthy says he expects to begin operations in Egypt soon. . . . ¶Iran announces she is ready to sell oil and products to Communist countries on completion of "necessary formalities."

REFINING.—Graphitization just one of the factors which caused three fluid cat reactor failures early this year, A.S.M.E. told. . . . Kellogg engineers and metallurgist blame thermal strains, other factors, in addition to graphitization. . . . ¶Shortage of acids, caustics turning refiners' attention more and more toward recovery and utilization of refinery waste, Atlantic engineer tells A.I.Ch.E. . . . Trend is toward use of multiple sewerage and collection systems, designed into new plants. . . . ¶General Petroleum Corp. begins project to increase aviation-gasoline production. . . . ¶PAD begins survey of Districts 1 and 2 to determine availability of finished-product storage. . . .

TRENDS.—Refinery runs averaged 6,757,000 bbl. daily for week ended November 24 to set a new all-time record. . . . The new record represents a gain of 141,000 bbl. daily over previous week and 519,000 bbl. daily over same week last year. . . . Greatest gain was in District 2, up 66,000 bbl. daily for the week and 200,000 bbl. daily over same week in 1950. . . .

ACTIVITY.—Crude production for week ended December 1 averaged 6,162,750 bbl. daily, up 8,325 bbl. daily. . . . ¶Total well completions increased 30 wells to 850. . . . ¶Wildcat completions totaled 224 wells compared with 235 for previous week and 147 for same week last year. . . . ¶Rotary rigs operating in United States on November 26 set another all-time record at 2,972 rigs. . . .

PIPE LINES.—Texas-Illinois finishes final testing of big $135,000,000 gas line from Texas Gulf Coast to Joliet, Ill. . . . Under construction for 15 months, the 1,417-mile, 30-in. system was scheduled to be dedicated and placed in operation this week. . . . ¶PAD earmarks 641,599 tons of line pipe for construction of oil and gas lines in the first quarter of 1952. . . . In the breakdown, 259,510 tons go to oil lines, 34,662 to products lines, and 314,949 tons to natural-gas projects. . . . ¶United pushes construction of 1,200 miles of new gas lines in Texas, Louisiana, and Mississippi. . . .

GOVERNMENT.—Threatened dearth of lube-oil additives countered by concerted action of PAD and NPA. . . . Needed raw materials for capacity operation of plants supplied, new construction encouraged. . . . ¶Possible shortage of L.P.G. this winter leads PAD to query 13,000 producers, marketers, distributors, and dealers on storage facilities. . . . ¶OPS sets up new pricing formula for pipe distributors in effort to choke off thriving gray market. . . . ¶Pipe-procurement rules for operators drilling 11 or fewer wells annually clarified by PAD. . . . ¶Surplus-tanker deal up for scrutiny before the Senate Investigations Subcommittee again in January. . . .

INDUSTRY.—Phillips Petroleum Co. given eleventh award for chemical-engineering achievement. . . . Award based on company's pioneering work in high-abrasion carbon-black manufacture and cold-rubber development. . . . ¶A. J. McIntosh predicts further increase in oil burners of 10 per cent during 1952, but indicates added oil demand will be met handily by industry. . . . ¶Petrochemicals development on Gulf Coast setting new record during 1951. . . . More than quarter of a billion dollars invested in plants announced, started, or completed this year, almost equal to entire postwar expenditures prior to 1951. . . .

Wage Drive

Oil unions shooting at 25-cent general increase in spite of ceilings; Sinclair is first target in nation-wide drive

DENVER.—A coordinated campaign to increase wages by 25 cents an hour throughout the petroleum industry has been launched by a group of 18 labor unions representing 250,000 workers in all branches of the industry and all parts of the country.

The requested increase admittedly is greater than that permitted by present rules of the Wage Stabilization Board and is a frank attempt to break through existing wage ceilings.

The drive is being spearheaded by the Oil Workers International Union (C. I. O.), with headquarters in Denver. O. A. Knight, president of that body, was named permanent chairman of the group of cooperating unions at a joint strategy conference held in St. Louis November 24-25.

Strike notice filed.—The O.W.I.U. has filed a formal notice with the Federal Mediation and Conciliation Service that as regards its members a labor dispute exists and that notice of intent to strike has been filed with the appropriate agencies of 31 states. The notice names more than 350 oil companies with which the union has contracts and states that most of these contracts have either expired or been reopened for renegotiation and reguests have been made that the others be modified by mutual consent.

Knight's letter to the conciliation service stated:

"We offer to continue to meet and confer with these companies for the purpose of negotiating either new contracts or modifications and to meet with you or appropriate state agencies for this purpose. We are most anxious to cooperate with our Government for the purpose of avoiding any interruption of defense production.

"However, in all fairness to you, we feel that we should advise you that this dispute for a general wage increase is very grave, and that employes involved are exceptionally restless because of their curtailed earning power during this period of time when prices are completely out of line and when industry is making tremendous profits, completely out of proportion to the rise in general wages. Under these conditions, there has been no equality of sacrifice in our defense effort and wages have been frozen rather than stabilized, as contemplated by the Defense Production Act."

Sinclair first.—The first step in the campaign will come December 17 in New York when negotiations begin on revision of the O.W.I.U. contract with Sinclair Oil Corp. This is the union's largest contract, and covers approximately 10,000 employes.

The St. Louis strategy meeting was attended by representatives of several unions affiliated with the American Federation of Labor and many independent unions and associations of employes of individual oil companies. This conference agreed to form a united front and pledged that no union would accept an offer of less than 25 cents general increase without the consent of the other unions.

The O.W.I.U.'s newspaper described the St. Louis agreement as ushering in a new era in labor unionism, and said the united front was formed "to combat the organized might of the oil companies." It said that oil companies are offering only the wage increases obviously allowed by present rulings of the Wage Stabilization Board, and added:

"O.W.I.U.'s campaign committee calls for the outright puncture of WSB's wage ceilings. O.W.I.U. insists that these wage ceilings are not fair. The union is out to get wage-increase agreements greater than allowed by WSB ceilings, then go to WSB and argue for a revision in the ceilings."

In explanation of this position, the newspaper carries a discussion by Lindsay P. Walden, general counsel of O.W.I.U., which declares that the various WSB rulings permit wage increases of about 13.2 per cent above the level of January 15, 1950, without board approval. Increases beyond that must have board approval but Walden declares there is nothing in the law to prevent such approval, but the first step is to get employers to agree to greater increases before the board will consider the matter.

It was interpreted as an additional effort to place wage negotiations on a national basis, long an objective of C.I.O. representatives in the oil business. The plan has been opposed by operators who point out the substantial variations in working conditions based on location, living costs and size and scope of operations.

Wages and earnings.—It is pointed out that the wages of union employes in the oil business, as revealed by the latest reports of the Department of Labor, are among the highest and in some areas the highest of all industry, a situation which has prevailed for many years.

As to earnings, analyses have shown that net incomes in relation to invested capital have been lower than those of several industries. There have been a few exceptions in situations involving unusual and temporary conditions for the fortunate operators.

It is also pointed out that the earning trend for most oil operators turned downward during the last 6 months, reflecting not only higher taxes but also generally higher costs in all operating phases in the face of price ceilings.

Small-refiner outlook.—In the case of the smaller refiners in the Mid-Continent and other areas this trend has been accentuated by weakness in the spot market for several products which have reduced refinery realizations several cents per barrel.

Some of these operators explain frankly that plant shutdowns are assured if they are forced to accept the proposed wage increases unless the additional wage costs are offset by higher prices for finished products or lower prices for crude oil.

In general, wage costs are higher in relation to refinery throughput at the smaller plants when compared to the major refineries with operating units of large daily capacity. In the past it has been the practice of union representatives to recognize this situation in negotiating contracts.

Industry Opposed

Refiners to contest claims of unions in more-pay move

TULSA.—Executives of oil companies have as yet made no public statements regarding the announcement of the Oil Workers International Union it will seek a general increase of 25 cents per hour in wages throughout the oil industry.

However, various comments in Tulsa the first of this week indicated that the program and the contentions on which it is based will be challenged by large and small refinery operators.

Tidelands Leasing Urged

KANSAS CITY.—Delegates to the annual meeting here last week of Consumers Cooperative Association called for immediate action by the federal Government to resume leasing operations in the offshore lands it claims.

An announcement of the cooperative, which has large interests in the petroleum industry, said members called for "whatever action is necessary" under the federal Minerals Leasing Act and the Defense Production Act to "mobilize these reserves for national defense."

K. S. Adams, Phillips chairman, left, receives congratulations of Alfred H. White. Right, seated, are Karl T. Compton, M.I.T. chairman, and Sidney D. Kirkpatrick, Chemical Engineering editorial director.

Phillips Honored

Eleventh award for chemical achievement goes to company for pioneer carbon-black, cold-rubber development work

, George Weber

NEW YORK. — Phillips Petroleum Co. was honored last week with the 1951 Award for Chemical Engineering Achievement.

The citation, sponsored by McGraw-Hill Publishing Co. through Chemical Engineering is the eleventh to be given since the program for so recognizing group accomplishment was begun in 1933.

Basis for the high recognition given Phillips was the company's pioneering development of high-abrasion carbon black, coupled with its important contributions to the successful commercial production of cold rubber. This combination of two interrelated projects was named the most significant achievement of the past 2 years.

At the Waldorf-Astoria Hotel before a group of over 750 engineers, chemists, educators and industrialists, K. S. Adams, chairman of Phillips, accepted a plaque in the name of the hundreds of chemical engineers, chemists, and other Phillips personnel who participated in the two programs. The award recognizes group effort rather than individual achievement.

The presentation was made by Alfred H. White, professor emeritus of chemical engineering at the University of Michigan, who served as chairman of the 1951 award committee.

Public benefits cited.—"The oil industry through research has outstripped any other in developing byproducts from its basic raw material," said Karl T. Compton, chairman of the Massachusetts Institute of Technology, and featured speaker at the award dinner.

Expressing Phillips' work in terms of practical results, he added: "When we say to Mr. John Q. Public that 'these developments of high-abrasion carbon black and cold rubber give you automobile tires which will wear for 50 per cent more mileage; they reduce the requirement to import natural rubber; they reduce the size of the rubber stockpile which our nation must purchase to be self-sufficient in a war emergency,' then he realizes that these technical developments mean something very real to him, in service and in economy."

Carbon black. — The company's research leading to the commercial production of a superior carbon black began 15 years ago when the company initiated a program designed to substitute oil for natural gas as a raw material. The intent was to conserve natural resources by improving the yield of product.

By the time the oil-furnace process reached pilot-plant stage, it had demonstrated the possibility of carbon recoveries on the order of 50 per cent as contrasted to the average recovery of only 4 per cent from the conventional channel process using natural gas.

By 1943 the first commercial plant was placed on stream producing Philblack A. Although this first oil black showed less abrasion resistance than channel black when compounded with the newly developed GR-S synthetic rubber, it filled a critical need with its superior properties when blended with butyl and other synthetic rubbers.

Following the war, the company launched an aggressive program aimed at developing oil blacks with higher abrasion-resistant properties which would extend the life of tire treads. A result was Philblack O which, in combination with the concurrently developed cold rubber, produced tires which proved 50 per cent more wear-resistant than the previously superior natural rubber compounded with channel black.

Cold rubber. — Meanwhile, the company was also playing a key role in the development of a butadiene-styrene polymer termed cold rubber. This synthetic, produced with only 3 hours' reaction time at a temperature of 41° F., combined the advantages of improved properties and higher production rates.

Cold rubber was a cooperative development in which many companies and individuals participated. Phillips' share in the work consisted of the design and successful operation of the first refrigerated pilot plant for low-temperature polymerization and the development of new recipes and chemical initiators for commercial production.

Through its dual role in making cold rubber commercially possible and in producing an oil carbon black which, in combination with cold rubber, results in a highly superior tire tread, Phillips is largely credited for tipping the balance from natural to synthetic rubber tire treads.

For thereby bettering the consumer's tire economy and improving the nation's defense position, Phillips became the choice of the 1951 award committee.

Earlier industry honors.—The petroleum industry's high standing in the chemical-engineering profession is well indicated by the fact that Phillips is the third oil company to receive the award.

In 1939 Standard Oil Development Co. was recognized for developing new aviation fuels and synthetic chemicals from petroleum. Shell Development Co. received the award in 1948 for commercial synthesis of glycerine from petroleum. In addition, several oil companies were named in the group award which in 1943 went to the American synthetic-rubber industry.

Petroleum's position as a chemical raw material is further indicated by two other awards made to companies engaged in petrochemical manufacture. Carbide & Carbon Chemicals Corp. was honored with the first award in 1933 for developing a chemical industry based on petroleum and natural gas. Again in 1949, Celanese Corp. of America was selected for greatest achievement in integrating its textiles, plastics, and chemical operations, also based largely on petrochemistry.

Waste Control Trend

Shortage of acids and caustics causing refiners to pay more attention to utilization of wastes, A.I.Ch.E. told

George Weber

ATLANTIC CITY.—Recovery and utilization of refinery wastes are receiving increasing attention today due to the increasing scarcity of acids and caustics.

Roy F. Weston, sanitary engineer for Atlantic Refining Co., Philadelphia, told the American Institute of Chemical Engineers here this week that waste control is being continually studied to determine the exact nature of the problem and the various methods and devices which may bring about an economical solution.

Waste control is now being considered seriously even during design of new refinery installations, he said. There is a definite trend, he said, toward installing multiple sewerage and collection systems at new units and in new refinery areas to handle separately polluted process drainage, clean cooling water, storm-water drainage, and sanitary wastes.

Weston reported that other processing chemicals and petroleum derivatives, such as phenol, methyl ethyl ketone, benzene, and furfural, are being collected in separate systems and recovered by distillation. Local treatment of wastes combines the advantages of reducing contamination, decreasing conditioning costs, and improving waste recovery.

Good housekeeping, an important basic factor in controlling refinery waste, is accomplished by revealing to operators and their supervisors the losses of various products and intermediates to plant sewers. A well-organized waste-control department supported with adequate laboratory and control facilities has become the rule in most refineries, he said.

Cites research.—The research being undertaken by the A.P.I. committee on disposal of refinery wastes was cited as an example of the progressive attitude which the industry has long shown in preserving water resources.

A committee-sponsored basic-research project at University of Wisconsin will form the basis for new recommendation on design of gravity differential-type oil-water separators. Further fundamental research is being supported to evaluate the effects of refinery wastes on bacterial and invertebrate forms of aquatic life, from which laboratory toxicity evaluation procedures will be standardized.

Field methods for toxicity evaluations are planned, and the committee is currently revising and expanding manuals on good practice for chemical wastes and analytical methods.

Arosorb process.—Process variables and other chemical-engineering factors of the new arosorb process were presented before the Institute by James I. Harper, John L. Olsen, and Frank R. Shuman, Jr., Sun Oil Co., Philadelphia. The new process, employing the selective adsorption of aromatic hydrocarbons on silica gel, will have its first commercial application in separating benzene and its homologs from catalytic reformate.

The authors presented a series of charts designed to show, for a typical example, how to select the correct volume of charge per pound of gel per cycle and how to choose the ratio to charge of either or both of two desorbents. Factors involved in the design of the gel cases, such as percolation rate and height, were also discussed. Gel case effluent compositions were charted, with cut points indicated for obtaining maximum product purity and optimum product recovery.

Gas-dehydration costs.—John M. Campbell, Black, Sivalls & Bryson, Inc., Oklahoma City, in a paper on "Design and Choice of Equipment for Gas Dehydration," discussed and presented investment and operating costs on dehydration systems employing four techniques: Dry desiccant adsorption, triethylene glycol absorption, autorefrigeration, and glycol injection.

New officers.—William I. Burt, vice president in charge of manufacturing for B. F. Goodrich Chemical Co., Cleveland, was elected president of A.I.Ch.E. for 1952. Other officers include: William T. Nichols, director, general engineering department, Monsanto Chemical Co., vice president; Stephen L. Tyler and C. R. DeLong, both of New York City, executive secretary and treasurer respectively.

Five new directors include: William T. Dixon, manager, design division, engineering and construction department, Atlantic Refining Co., Philadelphia, to serve 1 year; and J. Henry Rushton, professor of chemical engineering and director of the department, Illinois Institute of Technology, Chicago; Philip H. Groggins, chief agricultural-chemicals section, chemical division, National Production Authority; J. C. Elgin, professor of chemical engineering, chairman of the department, and associate dean of the engineering school of Princeton University; and Arthur K. Doolittle, assistant director of research, Carbide & Carbon Chemicals Co., South Charleston, W. Va., all to serve for 3 years.

Oil-Burner Use Gains

Socony economist sees 10 per cent rise during 1952

CHICAGO.—The number of domestic oil-burner users in the United States is expected to rise 10 per cent next year, Albert J. McIntosh, oil economist for Socony-Vacuum Oil Co., Inc., predicted here this week.

The petroleum industry will have no trouble whatever in supplying these additional distillate fuel-oil needs either this winter or the following one, he said. The increase of 10 per cent expected next year is in addition to an estimated increase of 13 per cent this year, and a rise of 127 per cent since the end of World War II.

McIntosh estimated that total distillate demand for 1952 would be a little more than 1,300,000 bbl. daily compared to slightly more than 1,200,000 bbl. daily in 1951.

Distillate oil demand, he said, will jump about 45 per cent during the next decade, compared to a slower rate of growth in gasoline consumption. However, the disparity in these rates will eventually require fundamental changes in refinery operations and a closer price relationship be-

Announcement

IN order to improve its many weekly services to the oil and gas industry, The Oil and Gas Journal, effective the first of the coming year, will change its publication date from Thursday to Monday. The last issue of this year will be December 27 and the first issue of 1952 will be January 7.

This change will enable the Journal to report and analyze a week's developments more effectively and make this information available to readers at the start of the operating week. The plan will improve the timeliness of vital statistical reports applying to field, plant, and transportation activities compiled by the Journal editors and other agencies and broaden the coverage of the week's outstanding events.

We are confident that this latest Journal program, made after a long and thorough study, will meet with your entire approval.

P. C. LAUINGER,
Publisher.

tween distillate oil and gasoline. McIntosh said that whether the latter will be accomplished by an increase in the price of distillate fuel or a decrease in the price of gasoline remains to be seen.

He estimated that domestic central-heating oil-burner installations will total 715,000 this year, and about 690,000 in 1952. This compares with 749,855 last year, and the all-time peak of 829,470 in 1947.

550,000 this year.—Allowing for use of some of these units for replacement purposes, McIntosh said it appears as though the industry would add 550,000 new burner users this year and perhaps 515,000 during 1952, to the 5,172,134 in existence at the start of 1951.

McIntosh, in commenting on space heaters which use kerosine, said that there is no indication of any shortage of kerosine or No. 1 fuel. Present supplies are adequate, he said, and the industry has clearly demonstrated that it can take more kerosine out of the barrel than it has been doing recently or than the forecast indicates will be necessary during this or next year.

Industry Briefs

PIERRE, S. D.—South Dakota plans to be ready if and when oil is found in quantity in the state. Gov. Sigurd Anderson last week asked State Tax Director W. R. Wilder to start compiling material on oil and gas taxes. Anderson said ideas and recommendations would be submitted to the state legislative-research council, declaring such taxes are "something we have to prepare for" in the event oil is found.

BATON ROUGE.—Louisiana's daily oil production allowable for December has been set at 636,883 bbl., relatively unchanged from November's figure of 635,713 bbl. Allowables by districts are: Houma, 123,067; Lafayette, 160,135; Lake Charles, 70,809; New Orleans, 168,612; Monroe, 68,185; and Shreveport, 46,075.

WASHINGTON.—All but 4 of the 181 large drilling companies asked by the Petroleum Administration for Defense to permit the publication of their drilling programs and tubular goods inventories have responded, with only 4 of those remaining refusing to consent to publication.

SAN FRANCISCO. — Standard Oil Co. of California has ordered a 16,665-ton tankship for addition to its Pacific Coast fleet, with delivery scheduled for mid-1953. The $5,250,000 vessel will be built at the Chester, Pa., yards of Sun Shipbuilding & Dry Dock Co. Capacity will be 140,150 bbl. Its design will permit it to carry a variety of oil products.

ROCKY MOUNTAIN

Forced Injection

New Colorado board insists natural gas be conserved

DENVER.—The Oil and Gas Conservation Commission of Colorado last week threatened to step into the Rangely field, the state's largest oil-producing area, and institute compulsory gas injection unless voluntary gas conservation steps are taken at once.

Warwick M. Downing, commission chairman, told operators gathered here that the commission had reluctantly postponed compulsory action on injection of now-flared gas into the Weber sands "in the hope that the industry will do something and agree."

Currently, both The Texas Co. and The California Co. are conducting pilot gas-injection operations and are returning about 3,000 M.c.f. of gas daily to the Weber sand. The commission would ask the operators to return all gas to the producing Weber reservoir.

Downing said Rangely had produced 25 per cent of its gas and that the rest had to be conserved.

At the hearing The California Co. recommended that the commission establish a limiting gas-oil ratio of 1,000 cu. ft. of gas per barrel of oil. In proposing 40-acre well spacing for Rangely the firm contended that closer spacing would cost $50,000,000 and an "untold tonnage of steel."

The Rangely hearing on gas conservation overshadowed the formulation of new statewide oil and gas production rules.

Richey Well Completed

BILLINGS, Mont.—Shell Oil Co. has completed the first oil well in the Montana portion of the Williston basin.

Shell's 1 Northern Pacific Railroad 19-23n-50e, flowed 1,656 bbl. of 38°-gravity oil in the first 24-hour test of the Charles (Mississippian) formation between 7,183-7,285 ft. Test was made following acid treatment of 1,500 gal.

This Richey area well was the first wildcat in the Montana portion of the Williston basin to flow substantial quantities of oil on drill-stem tests. This discovery was indicated last July when tests of an interval immediately below the casing shoe at 7,183 ft. flowed oil at rates between 20 and 100 bbl. hourly.

Shell's well is the second oil well to be completed in the Williston basin. The first was Amerada Petroleum Corp.'s 1 Iverson, 6-155n-95w, Williams County, North Dakota, originally completed in the Devonian near 11,650 ft. This well has been plugged back to 8,364 ft. to test the Mississippian, found productive in the same company's 1 Dilland at about 8,500 ft. on a drill-stem test. The 1 Dilland, 1½ miles north of the 1 Iverson, is now drilling below 10,279 ft.

Colorado Tax Pushed

DENVER.—A third effort to force passage of an oil-severance tax in Colorado is in the making.

A meeting to get the ball rolling was held here by civic leaders recently. It resulted in the formation of the Oil Severance Tax Committee of Colorado. Revenue from the tax would be earmarked for state aid to public schools.

The group plans to carry out its aims by circulating petitions to place the tax question on the 1952 ballot as an initiated referendum for a constitutional amendment. A minimum of about 35,000 signatures is needed in the next 90 days.

To assure that the funds would go to public schools, the committee will push the referendum irrespective of what the legislature will do toward passing a severance-tax law when it convenes in January.

Sinclair Strike Reported

CASPER.—Sinclair Oil & Gas Co. this week completed its important wildcat 3 miles east of the north end of Salt Creek field as a producer.

The well, 1 East Salt Creek A, swabbed 203 bbl. of 35°-gravity oil in 21 hours. Production is from the Lakota sand through perforations at 5,910-5,950 ft. and from the Second Wall Creek sand at 4,942-4,963 ft. The well is a dual completion.

The wildcat is located on a 9,300-acre block controlled by Sinclair but jointly held with Baruch Oil Co. and Isbrandtsen Steamship Co.

Canadian Firm Enters Play

EDMONTON, Alta.—Federated Petroleums, Ltd., a Canadian independent, has entered the drilling play in the Williston basin of the United States in a big way.

Federated has acquired more than 400,000 acres of freehold and government leases in Montana and North and South Dakota. The company plans an exploration program involving expenditures of more than $1,000,000 in the three-state area.

It is the first such large-scale move by a Canadian independent since the Foreign Exchange Control Board recently authorized Canadian oil and mining companies to secure funds for development programs in the United States.

PETROCHEM LAYOUT.—Natural gas is converted to synthetic gasoline in the huge Carthage Hydrocol, Inc., plant at right in this aerial view near Brownsville, Tex. Chemicals are separated and refined in the Stanolind Oil & Gas Co. plant, upper left, and are prepared for market in the U. S. Industrial Chemicals, Inc., plant, just out of the picture at left

Growing Giant

Petrochemicals plants going up at record rate along the Gulf Coast; cost of 1951 projects set at $250,000,000

F. Lawrence Resen

HOUSTON.—This is by far the biggest year in the history of petrochemicals development along the Gulf Coast.

In 1951, alone, plant projects announced, started, or completed in the area between New Orleans and Brownsville involve the expenditure of more than $250,000,000. Basic raw materials for these plants include oil or natural gas.

This new construction centers in three localities—Houston, where $111,716,000 is being invested in six plants; the Port Arthur-Port Neches area, where $22,631,000 is being spent in three plants; and the Freeport-Texas City area, where companies are investing $74,586,000 in eight projects.

When the war began, investment in the Gulf Coast petrochemicals industry stood at about $65,000,000. A huge wartime expansion program sank nearly a billion dollars into the industry, much of it in rubber plants. Postwar investments prior to 1951 totaled about $300,000,000 a figure almost matched by this year's $258,266,000 plus unannounced costs in three plants.

In April of this year a study showed that there were 43 companies operating 51 plants in the petrochemicals industry in the Southwest. *(The Oil and Gas Journal, May 3, page 112.)* Since that time, 10 new companies have entered the field and 24 projects are under way.

New companies.—Latest of the newcomers to the petrochem field in this area is Heyden Chemical Corp., which has announced plans for a $12,000,000 methanol (methyl alcohol) plant in Houston using natural gas as its raw material.

Pan-Am Southern Corp. about the same time announced plans to venture into the petrochemical field with construction of a 2,000,000-gal. per year polybutene plant and the revamping of a polymerization unit for the production of 3,800,000 gal. of propylene tetramer annually. Polybutene is used in making motor-oil additives; the tetramer is used in the manufacture of synthetic detergents. Both units will operate at Pan-Am's El Dorado, Ark., refinery.

At Port Arthur, Tex., Gulf Oil Corp. is building a $15,427,000 ethylene plant and a $704,000 isooctyl alcohol plant. The ethylene production is unique in that a pipe line will be constructed to furnish the ethylene to various plants in the general locality. Close by, Koppers Co. has a $6,500,000 petrochemical plant under way which will receive its raw material from Gulf.

At Lake Charles, La., American Petrochemical Corp., a joint venture of Cities Service Refining Corp. and Firestone Tire & Rubber Co., will receive light hydrocarbons from Cities Service refinery and produce various petrochemicals such as synthetic-rubber intermediates, plastics, and lube-oil additives. Also at Lake Charles will be constructed a $7,000,000 plant to make catalyst, which, although not a petrochemical, is tied in with the refining industry.

Houston will be the site of Alamo Chemical Co.'s $38,260,000 petrochemical plant for the production of plastics, antifreeze compounds, and

GULF COAST PETROCHEMICAL PROJECTS ANNOUNCED, STARTED, OR COMPLETED IN 1951

Company and products—	Investment
Alamo Chemical Co., Houston—Plastics, antifreeze, etc.	$38,260,000
American Petrochemical Corp., Lake Charles, La.—Plastics, lube-oil additives	
Atlantic Refining Co., Atreco, Tex.—Detergent base	
Celanese Corp., Bishop, Tex.—Trioxan and paraformaldehyde	3,502,000
Commercial solvents, Sterlington, La.—Ammonia	20,458,000
Dow Chemical Corp., Freeport, Tex.—Perchloroethylene	3,141,000
Dow Chemical Corp., Freeport, Tex.—Ethylene	5,000,000
E. I. du Pont de Nemours & Co., Inc., Victoria, Tex.—Nylon salts	
Ethyl Corp., Houston—Tetraethyl lead, ethyl chloride, sodium, chlorine	45,000,000
Ethyl-Dow Chemical Co., Freeport, Tex.—Ethylene dibromide	8,185,000
Gulf Oil Corp., Port Arthur, Tex.—Ethylene	15,427,000
Gulf Oil Corp., Port Arthur, Tex.—Isooctyl alcohols	704,000
Heyden Chemical Corp., Houston—Methanol	12,000,000
Kolker Chemical Works, Inc., Houston—Benzene	
Koppers Co., Port Arthur—Petrochemicals	6,500,000
Lubrizol Co., Houston—Lube-oil additives	2,000,000
Monsanto Chemical Co., Texas City—Styrene	8,600,000
Monsanto Chemical Co., Texas City—Acryloniprile, hydrogen cyanide	25,633,000
Pan American Refining Co., Texas City—Benzene	1,100,000
Phillips Chemical Co., Houston—Petrochemicals	4,056,000
Phillips Chemical Co., Texas Gulf Coast—Anhydrous ammonia methanol, acetylene	38,760,000
Shell Chemical Corp., Houston—Ethyl chloride	
Shell Oil Co., Houston—Benzene	10,400,000
Union Carbide & Carbon Co., Texas City—Methanol	7,500,000
Total	$258,226,000

similar petrochemicals. The company is a joint venture of Phillips Chemical Co., General Aniline & Film Co., and Borden Co. Kolker Chemical Works also announced plans for a benzene plant in the Houston area. (Diamond Alkali Co. has been reported considering a merger with Kolker.) A $2,000,000 plant for the production of lube-oil additives was completed in this area by Lubrizol Corp. Heavy petroleum stock from nearby refineries is used for the production of the additives.

Ethyl Corp. has the biggest single program under way in Houston where $45,000,000 is being spent in the construction of a tetraethyl lead plant and plants for the production of ethyl chloride, sodium, and chlorine. In Freeport, Ethyl-Dow Chemical Co., has an $8,185,000 program for the production of ethylene dibromide.

Other plants.—Other projects under way by petrochemical organizations include Shell Oil Co.'s $10,400,000 benzene project at Houston, and Shell Chemical Corp.'s expansion of its ethyl chloride facilities. Pan American Refining Co. has a $1,100,000 benzene project under way at Texas City, and Phillips Chemical Co. is spending $4,000,000 in Houston and $38,000,000 more in other facilities along the Gulf Coast. Union Carbide and Carbon Co. has a $7,500,000 methanol plant going in at Texas City, and E. I. du Pont de Nemours & Co., Inc., has a nylon salt plant under way at Victoria, Tex. In Bishop, Tex., Celanese Corp. is adding a $3,502,000 formaldehyde plant. Monsanto Chemical Co. has $34,000,000 in two plants under way in Texas City for producing styrene, acryloniprile, and hydrogen cyanide.

Tidelands Stand Taken

NEW ORLEANS.—Standard Oil Co. of California and its producing subsidiaries will carry out no more exploration and development in the tidelands until a clear-cut decision on administration of these areas is made, according to R. Gwin Follis, chairman of the board.

At the company's first board meeting here, Follis said that The California Co. together with Standard Oil Co. of Texas, both California Standard subsidiaries, now produce more oil than the parent company.

Reactor Report

Specialists agree graphitization not the only culprit in fluid cat failures; thermal strains, other factors blamed

George Weber

ATLANTIC CITY. — Graphitization is not the only cause for failure of three fluid catalytic cracking reactors earlier this year.

Further, added limitations on the use of carbon steel in such service does not appear to be warranted.

These are two of the cautious conclusions reached by three engineers and a metallurgist with M. W. Kellogg Co. in a report presented here last week at the annual meeting of the American Society of Mechanical Engineers.

The report summarized a study of the three failures and is the first of its type to be released since the so-called "graphitization scare" in refining circles last spring.

Another conclusion reached by the authors at this stage of their investigation is that thermal strains and strain gradients attending shutdowns, while not considered severe enough to start cracks in sound material of the expected physical properties, may still have initiated cracks in zones of low ductility or fatigue or could have propagated existing flaws or cracks.

Background.—Graphitization has occupied the center of attention, possibly unduly, since the reactor trouble last spring.

The first vessel developed a leak in early February. On examination it revealed numerous cracks at the edges of both longitudinal and girth welds. The vessel was constructed of Type 347 integral-clad carbon steel and had served 53,000 hours at 900 to 975° F.

During the next 3 months a second reactor failed and a third was found to be badly cracked. The latter two have since been repaired and are back in operation with internal insulating liners installed to minimize further deterioration until they can be replaced.

Samples taken from the first reactor revealed the carbon steel base metal to be graphitized. Graphite was nodular and in general uniformly distributed. Only one instance of chain-type graphitization was found and there were no "eyebrow"-type formations, which are known to have caused a power-plant line failure.

Possible causes. — Concurring with other investigators, the Kellogg representatives point to other factors than graphitization which may have caused the failures.

Kellogg's study covered not only the three clad reactors which failed, but other reactors, clad, lined, and unlined.

Among the possible contributory factors they considered were:

1. Underbead cracks.
2. Stress concentration due to undercutting at the edge welds or heavy weld reinforcement.
3. Hydrogen embrittlement due to the use of electrodes not of the "low-hydrogen" variety.
4. Fatigue in cyclic service.
5. Impact and vibration effects.
6. Effects of graphitization on mechanical properties.
7. Notch effect at edge of alloy weld deposit due to its greater depth than the alloy-cladding thickness.
8. Propagation of initial fabrication cracks in alloy or carbon steel welds, such as micro-cracks or cracks at the junction between the carbon and alloy steel.
9. Thermal stress resulting from differnce in expansion of alloy and carbon steel in integral-clad plate or composite welds.
10. Fatigue attendant to thermal cycling in integral-clad plate construction.
11. Stress - rupture failure due to combined operating stresses.

Of these factors particular emphasis was placed on the role of graphitization on mechanical properties and on the last three factors concerning the thermal stresses in bimetallic construction.

Graphitization conclusions. — On the basis of their knowledge of graphite occurrence in the power industry and in refinery equipment, the authors made these conclusions:

1. The damaging effects of graphite in refinery equipment to the degree experienced by the power industries is not obvious at this time.
2. Graphitization does not appear to be solely responsible for the cracks in three integral-clad reactors.
3. Added limitations on the use of carbon steels in refinery equipment appear unwarranted in view of the limited hazard of graphitization so far established.
4. As with any form of material instability, continued use of susceptible materials should be accompanied by service examinations to develop its progress and serve as a basis for rehabilitation considerations.
5. One fundamental gleaned from research on graphitization to date probably should be incorporated in future materials specifications with the view toward increased resistance to graphitization. That is, restrictions on the quantities of aluminum permitted for deoxidation purposes in steel melting would be justified.
6. It seems likely that the economics of large initial investments and early obsolescence relative to refinery equipment compared with the power industry would dictate that certain amounts of graphite can be tolerated. In this light, continued research should assess the effects of both "chain" and scattered nodular graphite on the load carrying ability of carbon steel at elevated temperatures.

Thermal strains.—The cracks studied were located at welds. Neither the

base metal nor cladding showed ill effects away from welds.

The authors reported that the approximate analyses described indicate that stress conditions in the composite welds are such that both carbon and alloy steel weld metal would be expected to have less total plastic flow than the adjacent carbon-steel base metal and alloy cladding. Differential strains would, however, be encountered at the edge of welds due to different stress conditions and variations in the yield and creep properties of weld and base materials, the effects of which cannot be accurately assessed.

"Stress-rupture test data are not applicable in evaluating thermal effects, as we are dealing with internal stresses which are the result of strains rather than forces and which vary with time.

"On each temperature cycle there is a locked-up thermal strain of limited magnitude. The relief of this strain is dependent on the ductility of the material rather than its load-carrying ability. The approximate analysis herein presented indicates that the total elongation would be 1.4 per cent or less, and vessel measurements indicate actual elongations were considerably lower.

"The materials used in these vessels would normally be expected to yield such amounts without distress as is evidenced by the absence of any cracks away from welds. An analysis indicates less strain at welds than away from welds and hence offers no explanation for the cracking at welds or for the peculiar regular pattern of transverse cracks in the alloy weld metal.

"It is the opinion of the authors that thermal strains and strain gradients at welds were not sufficiently severe to initiate cracks in sound material of the expected physical properties. However, cyclic thermal strains could initiate cracks in zones of low ductility or fatigue resistance or propagate existing flaws or cracks.

"The prevalence of cracks adjacent to welds points to some weakness which is inherent or which developed in the structure of this zone. The extent of cracking at girth welds, which was at least as extensive as at longitudinal welds, would appear to be an indication that thermal rather than pressure effects were responsible for disclosing weak zones.

"It is known that some difficulty was encountered with micro-cracking of the alloy weld deposits during the vessel fabrication and that the original welds contained some such defects. These may have contributed to stress concentrations at the weld areas.

"Another factor which would add to the local stress effects at welds is the variation in the cladding thickness encountered on these plates, which varied up to 40 per cent of the total thickness and might be different on either side of the weld. The Unit B (second) reactor was cracked practically as badly as the Unit A (first) reactor even though it had only 11 cycles as compared to 26 for the latter vessel, while another reactor of the same design and operating time is still intact after having gone through 20 cycles; other units are not in difficulty as far as is known. Experience, therefore, does not permit any firm conclusions to be drawn."

Recommendations.—Although the investigators could not pin-point the causes for the reactor failures at this stage of the study, they did draw up a number of recommendations on precautions which refiners might take to foresee or prevent further difficulties.

Existing carbon or carbon moly steel equipment in service above 850° F. should be periodically inspected for the possibility of cracking at welded seams and locations of stress concentration.

Visual inspection should be supplemented by magnetic particle examination where practical, and should be extended and intensified to the extent of taking samples where cracks are discovered.

Weld-prober or plug samples for micro-examination are desirable for equipment in service for over 30,000 hours, or where cracks have been discovered.

Where practical, internal insulation should be considered as a means of prolonging the life of impaired vessels or large piping or arresting the progress of graphitization at any stage.

Welded joints involving materials with dissimilar coefficients of expansion in high temperature service should be inspected carefully, the frequency depending on both the difference in the expansion coefficients and magnitude and frequency of cyclic service.

SOUTHWEST

Richest Lease Sale Held

AUSTIN.—Oil companies bid more than $7,327,000 last week for about 50,000 acres of leases in the highest such sale ever held by the University of Texas.

A $2,050,000 bid by Gulf Oil Corp. for 2,583 acres of leases in Martin and Andrews counties also set a record as the highest single bid for oil rights. In all, Gulf spent about $2,750,000. The company's purchases included four leases in Upton County for $590,000, or about $1,000 bonus per acre.

The Texas Co. paid lease bonuses totaling almost $2,000,000. The company's purchases included a block of 1,649 acres in Upton and Reagan counties, plus 492 acres in three adjoining tracts, and four blocks in Andrews County.

CANADA

Alberta Allowable Cut

CALGARY.—A December allowable of 121,875 bbl. per day set here last week by the Oil and Gas Conservation Board of Alberta marks the fourth consecutive reduction from the August peak of 168,449 bbl. December's figure is 16,000 bbl. lower than November.

Biggest field slash was made at Redwater, where the new level was set at 49,468 bbl. daily, a cut of 10,968 bbl. under November. The D2 and D3 Lower Cretaceous reservoirs at Leduc were cut to 40,490 bbl. in December, off 4,985 bbl. from November.

Steady reduction in Alberta allowables since last summer is due to winter closing of shipping on the Great Lakes, which lowers pipe-line requirements of Interprovincial Pipe Line Co. Lack of sufficient major pipe lines has prevented full utilization of Alberta's expanding oil reserves.

Crude Line Opened

EDMONTON.—Edmonton Pipe Line Co. last week placed in operation its new 6-in. line connecting Joseph Lake field with the Interprovincial pipe-line terminal at Edmonton.

The line carries oil from the field's 67 producing wells. It has a capacity of about 3,000 bbl. per day. Construction was scheduled to be finished this week on the 52-mile gathering and transmission system connecting Wizard Lake field with the McColl-Frontenac refinery and the Interprovincial terminal here.

Line Pipe Allocated

Big natural gas, crude, products-line projects to get 641,599 tons for construction in first quarter of 1952

WASHINGTON.—A total of 641,599 tons of line pipe has been allocated by the Petroleum Administration for Defense for first-quarter 1952 construction of oil and gas lines.

The allocation for petroleum pipe lines was fixed at 314,949 tons, of which 259,510 tons was allotted to 10 large crude lines and 34,662 tons to 5 large product lines. The 15 lines have an estimated construction cost of $289,408,000 and involve a total use of 766,737 tons of pipe, and will have an initial daily capacity of 1,143,000 bbl. of crude and 224,700 bbl. of products. Smaller projects, including terminals, were allotted a total of 20,777 tons.

Three major natural-gas projects were allotted a total of 143,150 tons of pipe, with 183,500 tons going to 361 smaller projects, mostly gathering and distributing lines. None will use as much as 5,000 tons of steel. The three big systems will cost a total of $255,855,000 and will require 915,460 tons of pipe for completion, when they will add 1,552,000 M.c.f. daily to the nation's natural-gas transportation facilities.

United Gas project. — Largest of the gas projects now under way is the 1,108-mile expansion of lines of United Gas Pipe Line Co. from the Gulf Coast to Kosciusko, Miss., and Monroe, La., to provide a daily capacity of 920,000 M.c.f. for long lines into the East and Middle West at an estimated cost of $116,500,000. These lines, which will require a total of 141,000 tons of steel, were allocated 30,000 tons for the current quarter and will receive 44,150 tons during the coming quarter.

Texas Eastern line.—The second project is the 826-mile line of Texas Eastern Transmission Corp. from Kosciusko, Miss., to Connellsville, Pa., with a daily capacity of 382,000 M.c.f., to cost $74,815,000. The project, which will use a total of 223,000 tons of steel, was allotted 75,000 tons for the current quarter and will get 58,000 tons for the first quarter of next year.

T.G.T.—The third project is the extension of the Gulf Coast-Buffalo pipe line of Tennessee Gas Transmission Corp. to the New York-Massachusetts line, together with loops to increase the capacity of the line, to cost $64,540,000 and provide a capacity of 250,000 M.c.f. daily. The total steel required is 194,000 tons and the allocations were 67,000 tons for the present quarter and 41,000 tons for the first quarter of 1952.

Details of the 15 large crude and products lines follow, including name of the company, length and size of the line, initial capacity in barrels per day, estimated cost, estimated completion date, total pipe-line requirements, and first quarter pipe allotments:

Crude lines:

Platte Pipe Line Co.—1,080 miles 16-20-in., Wyoming to Wood River, Ill.; 70,000 bbl.; $59,000,000; third quarter 1952; 134,736 tons; 44,300 tons.

West Texas Gulf Pipe Line Co.—577 miles 26-20-in.; West Texas to Gulf Coast; 301,000 bbl.; $39,057,230; third quarter 1952; 130,000 tons; 58,000 tons.

Sinclair Pipe Line Co.—683 miles 24-22-in., Drumright, Okla., to Salisbury, Mo., and to Chicago; 280,000 bbl.; $51,942,000; third quarter 1952; 143,610 tons; 40,000 tons.

Shell Pipe Line Co. (Rancho).—463 miles 24-in., McCamey, Tex., to Houston; 209,000 bbl.; $41,593,000; third quarter 1952; 124,979 tons; 42,467 tons.

Texas Pipe Line Co.—319 miles 22, 12, and 10-in., Louisiana Gulf Coast area to Port Arthur, Tex.; 145,000 bbl.; $18,717,430; second quarter 1952; 54,246 tons; 51,745 tons.

Shell Pipe Line Co.—64 miles 8-in., Gohlke field to existing 10-in. crude line to Houston; 15,000 bbl.; $2,500,000; first quarter 1952; 55,153 tons; 4,101 tons.

Service Pipe Line Co.—40 miles 10-in., Kent County, Texas, to existing crude line to Drumright, Okla.; 20,000 bbl.; $1,493,000; first quarter 1952; 3,366 tons; 3,366 tons.

Continental Pipe Line Co.—105 miles 8-in., Rincon station to Port Isabella, Tex.; 17,000 bbl.; $1,935,000; second quarter 1952; 5,297 tons; 2,567 tons.

Texas Pipe Line Co.—187 miles 16-in., Corsicana, Tex., to Houston tie-in with 20-in. to Port Arthur, Tex.; 60,000 bbl.; $7,878,600; second quarter 1952; 27,492 tons; 12,000 tons.

Magnolia Pipe Line Co.—14½ miles 8-in., Scurry station to West Texas Gulf Pipe Line Co. line at Colorado City, Tex.; 20,000 bbl.; $741,500; second quarter 1952; 1,123 tons; 984 tons.

Products lines:

Shell Oil Co.—565 miles 14-8-in., Wood River, Ill., to Chicago and Detroit; 85,000 bbl.; $15,850,000; third quarter 1952; 38,588 tons; 12,605 tons.

Ohio Oil Co.—255 miles 8-10-in., East St. Louis, Ill., to Indianapolis; 18,000 bbl.; $1,710,000; second quarter 1952; 4,530 tons; 1,131 tons.

Buckeye Pipe Line Co.—391 miles 16, 12, 8-in., Linden, N. J., to Allentown and Oswego, Rochester, other New York points; 80,000 bbl.; $22,835,000; third quarter 1952; 48,191 tons; 15,219 tons.

Bell Oil & Gas Co.—145 miles 8-6-in., Ardmore to Drumright, Okla.; 9,000 bbl.; $3,271,396; second quarter 1952; 9,006 tons; 4,500 tons.

Phillips Petroleum Co.—932½ miles 8, 10, 12-in. loops, Borger, Tex., East St. Louis, Ill., Chicago; 32,700 bbl. to St. Louis; $20,883,450; first quarter 1952; 35,790 tons; 1,207 tons.

Crude Price Hike?

There's a possibility, but a lot depends on interpretation by OPS of Capehart amendment; early study is indicated

WASHINGTON. — Chances for a higher ceiling on crude-oil prices in the near future depend upon the interpretation laid by Office of Price Stabilization legal experts on the Capehart amendment to the Defense Production Act.

Under the Capehart amendment, OPS is required to adjust previously fixed ceiling prices to allow for all increases in cost incurred up to July 26, 1951. Regulations making the amendment effective have been issued for manufacturers. The fly in the ointment, however, is whether it applies also to the production of natural resources.

Estimate: 13 per cent.—If the amendment is held by the legal staff to apply to petroleum production, it could mean an estimated increase of around 13 per cent in present crude ceilings.

Evidence is accumulating that the industry is beginning to feel the effects of the increases in costs which have occurred since the outbreak of the Korean fighting, with stripper-well operators being pinched hardest.

Whether a 13 per cent increase in ceiling prices would relieve the pressure is under study in industry circles, where information is now being gathered to determine the effects of the steady increase in costs of material, labor, transportation, and other items over the past 4 or 5 years.

There is general belief that the situation warrants study, at least, by OPS, and it is expected that the question of price adequacy will be raised early next year. This is almost a sure thing if OPS holds that the Capehart amendment does not apply and may come about even if a measure of relief is afforded under the 1951 Defense Production Act.

There is no indication, however, that OPS has made any study on its own initiative of the crude-price situation, or that it will give the matter consideration unless formally asked to do so.

Situation obscured. — Producers contend that the situation is not as readily apparent as it otherwise might be

because the rearmament program and military business have given an impression of great activity and correspondingly great profits. But while dollar earnings were large in 1950 and the first part of 1951, they point out, recent earnings statements disclose a downward trend which has indications of accelerating if steadily increasing costs are not offset.

Harking back to their experience in the last war, many operators contend that prolonged maintenance of subnormal ceiling prices will lead to a scaling down of secondary-recovery work and contraction of exploratory operations by the smaller producers. It would have equally deterring effects on the bringing in of new production in high-cost areas where higher prices would be needed even for break-even operation.

There are indications that the whole question of price control will get another going over when Congress reconvenes next year. The joint committee on defense production already has opened hearings in which OPS policies and procedures have been explored. Pricing will be more exhaustively studied when legislation again extending the Defense Production Act is taken up, at which time it is expected the industry will take its problem to Congress.

Gray Market Hit

OPS sets up new pricing base for pipe distribution

WASHINGTON.—A pricing regulation aimed at wiping out the gray market in steel has been written for warehouses and other resellers of steel by the Office of Price Stabilization.

The order, establishing a pricing formula to be adopted by distributors of both domestic and many types of imported steel, has been under development since investigations in 25 states by the House Small Business Committee some months ago disclosed a thriving gray market was operating on a nation-wide scale.

In general, the regulation establishes the ceiling prices of resellers of oil-country tubular goods and other products on the basis of the prevailing pre-Korean markups at normal levels of warehouse distribution as applied to current producing mill prices. In most cases, OPS officials said, ceiling prices will be somewhat lower than those established under the General Ceiling Price Regulation.

Other than new.—Ceilings for secondary, rejected, reconditioned, and reusable iron and steel products are established on the basis of their historical price relationship to new products. Ceilings also are set for unreconditioned products.

Ceilings on sales by holders of excess stock not originally purchased for

WATCHING WASHINGTON

Bertram F. Linz

PAD Matures

The Petroleum Administration for Defense has about reached maximum manpower strength under the limited appropriation allowed it by Congress and the problem from now on will be to deal with any emergency, short of war, with the staff it now has.

Originally, it was planned to have a much larger organization because of fears a year ago when it was being set up that a bad supply situation was in the making. The organization blueprint called for field offices in each of the five districts, but only two have been set up, and no more are now considered.

Fortunately, a bad supply situation did not develop and the big organization at first contemplated has not been necessary.

However, the limitation in size will not greatly reduce the need to call upon industry to send men to Washington for a term of service with PAD. Most of the men now serving came in for a period of 1 year plus the time necessary to train them, generally 2 or 3 months, and many of them will be leaving over the next few months. Next spring two of the top men will leave, Assistant Deputy Administrator Alfred P. Frame on April 1 and Deputy Administrator Bruce K. Brown June 1. Brown, however, will continue to serve on a part-time basis as a consultant on recruitments.

PAD's rotation system is set up on a different basis from that of the other defense agencies, which get industry men in usually for a 6-month period. The PAD system of calling men up for a year's service plus their training period makes for more efficiency since, as Brown said, it takes 3 months for a new officials to find out what he is doing and another 3 months to find out what others are doing.

Pipe Lines vs. Ships.

With a big shipbuilding program which will take large volumes of steel plate about to get under way, officials of the Petroleum Administration for Defense are convinced it will be necessary to convert strip mills to plate production if line-pipe requirements of the natural-gas industry over the next 2 years are to be met.

In the last half of 1950 the industry used a total of 947 tons of pipe of all sizes, and this year will use 1,668,000 tons, of which 919,000 is large and 749,000 small-diameter pipe.

During the first half of next year steel of all types will be short but the situation is expected to ease off somewhat during the last 6 months.

There will, however, be a big need for pipe in 1953—both to complete 1951-52 projects which may be slowed down by lack of material and to provide for new construction which will by then be greatly needed.

Adding up the requirements of all projects now pending before the Federal Power Commission, PAD has concluded that the 1953 requirements will be in the neighborhood of 2,315,000 tons of pipe, of which 1,554,000 will be large and 760,000 small diameter.

Plate production now is not sufficient to permit pipe-line construction at anywhere near the rate PAD and the industry would like, and the Maritime Administration's shipbuilding program may cut deeply into what is available. Only the conversion of strip mills will make it possible to produce plate to support these expanding programs, it is argued.

Reading the Stars

Successor to Eric Johnston as head of the Economic Stabilization Agency is Roger Lowell Putnam, Springfield, Mass., industrialist, three-time mayor, and noted amateur astronomer. He takes over at a time when labor's demands for higher pay threaten to break down the whole pattern for control of wages and prices and nudge inflation a little further along.

Maybe Putnam can read the stellar regions to figure the result of Price Director Michael V. DiSalle's latest dodge to keep prices "in line." A number of important commodities are seeking markets at prices well under their ceilings, and DiSalle is proposing to roll back ceilings to eliminate the differential.

In this way the administration could claim it was succeeding in bringing prices down (which is good stuff in a campaign year, even though the ultimate consumer wouldn't benefit) and at the same time could make it appear that prices were still pressing against ceilings.

It is this type of thinking that the oil industry will be up against in its efforts to get a better price for crude.

resale will be limited to cost plus a nominal handling charge. Resellers of conversion steel or products made therefrom are required to apply to OPS for a ceiling on all sales.

If a person buys material from a holder of excess stock and resells it without putting it through a warehousing operation, his ceiling price is limited to a markup of 20 per cent over the applicable ceiling price of the holder or the actual price charged by the holder of the excess stock, whichever is lower.

So-called "finders" who do not purchase and resell but merely act as intermediaries may not add any fee to the ceiling price established by the regulation.

Lower cost to consumer.—OPS officials explained that the regulation is designed to establish resellers' ceiling prices at normal levels of distribution and thus prevent gray-market operations, maldistribution and the pyramiding of prices and markups through multiple sales, finder's fees and other devious methods of selling through other than normal channels of distribution. The over-all net result will be to limit or lower the cost of these products to the ultimate consumer, they said.

Most steel warehouses and jobbers did not raise prices abnormally beyond increased costs prior to the issuance of the General Ceiling Price Regulation. However, some warehouses and a large number of brokers and speculative resellers did push their prices to abnormal levels which were frozen under GCPR.

These abnormal prices were used in many cases by new resellers as the prices of their "most competitive seller," leading to a highly distorted pattern that resulted in excessive prices which fell most heavily on the small consumer.

Additives Action

PAD, NPA avoid shortage by digging up needed chemicals for capacity plant operation, encouraging new building

WASHINGTON.—A threatened shortage of lubricating-oil additives has been averted by prompt action of the Petroleum Administration for Defense and National Production Authority.

Evidence that the shortage was developing that might interfere with the defense program became apparent early this year, and PAD immediately initiated a study of the situation. A questionnaire sent to additive manufacturers brought responses from 25 companies which indicated a probable substantial increase in requirements in 1952, particularly in the field of detergents.

The two agencies rapidly made arrangements to provide necessary chemicals for capacity operation of present facilities. PAD also recommended certificates for accelerated amortization to encourage the construction of additional facilities, some of which already are completed.

As a temporary expedient, shifts were made from the production of less essential products, with the cooperation of the manufacturers, to more important needs.

Through these actions, Deputy Administrator Bruce K. Brown now believes that, barring any unforeseen circumstances, there will be adequate supplies of the important additives to meet all essential requirements.

Production and demand.—The results of its study of additives have been made available by PAD and are summarized in the accompanying tables, which show actual production and plant capacity in 1950, when it is assumed that production and demand were in balance; actual production, demand and capacity in the first quarter of 1951, and estimated demand in 1952. The 1952 demand figures, the sum of the individual estimates of the additive manufacturers, reflect no anticipated increase in military requirements.

"Bearing corrosion inhibitors," as used in the tables, are inhibitors normally used in premium heavy-duty oils to protect copper, lead, or other alloy bearings, often called antioxidant additives. They were separated from other antioxidant additives, however, due to their special importance.

Some of the "other inhibitors" listed are undoubtedly used in grease manufacture as well as various oils, but it was impossible to determine the end use in each case. The survey did not cover grease or grease-like lubricants or synthetic oils.

Sulfur consumption and requirements listed in Table 3 do not include sulfur used to make the sulfuric acid required in additive production, but does, however, include sulfur in such compounds as phosphorus pentasulfide.

Table 1 covers detergents, the expected higher 1952 requirements being attributed principally to an anticipated increase use in ordinary automotive lubricating oils.

Table 2 covers other additives, and Table 3 shows the actual 1950 and first-quarter 1951 consumption and estimated 1952 requirements for certain chemicals in short supply. All figures are on a monthly basis.

TABLE 1—DETERGENT PRODUCTION, DEMAND, AND PLANT CAPACITY
(Pounds per month active ingredient)

	1950 Actual	1951 (1st qtr.) Actual	1952 Est.
Production	4,204,345	6,320,658	
Demand		8,535,378	15,173,240
Plant capacity	6,385,894	7,710,000	

TABLE 2—OTHER ADDITIVES—PRODUCTION, DEMAND, AND PLANT CAPACITY
(Pounds per month active ingredient)

	1950 Actual		1951 (1st qtr.) Actual			1952
Additives—	Prod.	Plant capacity	Prod.	Demand	Plant capacity	Estimated demand
Bearing corrosion	2,750,442	5,155,357	3,208,964	3,778,377	5,482,650	4,822,566
Other inhibitors (incl. antioxidants)	1,018,185	*18,853,108	1,035,360	1,431,309	18,962,866	2,318,896
Extreme	3,457,625	4,262,485	4,633,144	5,294,678	5,255,999	6,234,316
V. I. improver	748,000	882,000	1,096,000	1,300,000	1,162,000	1,890,000
Pour point depressant	1,001,000	1,307,000	1,365,000	1,515,000	1,380,000	1,395,000

*Much of the plant capacity for "Other Inhibitors" is used in the manufacture of other chemicals most of the time and therefore cannot be considered as available except in an emergency.

TABLE 3—CHEMICALS IN SHORT SUPPLY
(Pounds per month)

	Requirements		
Chemical—	1950 Consumption	1951 1st quarter	1952 Estimated
Sulfur* (excluding sulfur used as sulfuric acid)	1,066,724	1,512,844	2,146,648
Sulfuric acid	5,140,055	8,287,670	†27,328,391
Petroleum sulfonates (100 per cent active)	3,152,127	5,322,637	9,333,620
Barium hydrates	1,220,412	2,082,025	3,615,000
Benzene	338,900	421,500	549,000
Phenol	688,414	1,105,420	1,657,283

*Includes sulfur in P.S. †Includes the estimate of a new manufacturer of petroleum sulfonates and is probably high.

L.P.G. Survey

PAD smells trouble, wants details on storage capacity

WASHINGTON.—Approximately 13,000 producers, marketers, distributors, and dealers in liquefied petroleum gas have been asked to tell the Petroleum Administration for Defense what L.P.G. storage facilities they have.

The survey was undertaken by PAD because the tremendous postwar expansion of L.P.G. consumption has put the country in a position where sudden developments in defense needs could place a heavy burden on the

industry, it was explained by Deputy Administrator Bruce K. Brown.

Consequently, he said, it is considered necessary to secure complete data on storage space in all the areas of greatest consumption, so that action may be taken quickly to meet any emergency. No attempt will be made, however, to check on consumer storage.

The questionnaire now being distributed asks for information on the number and capacity of all tanks in two classes, those with a working pressure over 200 psig. and those under 200 psig.

"Next to the television industry, the L.P.G. industry is probably the fastest-growing industry in the country," Brown declared, pointing out that between 1945 and 1950 sales increased 173 per cent from 1,276,660,000 to 3,482,567,000 gal.

Approximately 7,500,000 homes now use L.P.G. for heating, but total consumption for heating purposes is only about 58 per cent of the total demand, which includes its use for enriching manufactured gas or as a standby source, as a component in synthetic rubbers and chemical solvents, and as fuel for trucks, buses, and farm machinery. The use of propane as fuel, it was reported, increased from 20,264,000 gal. in 1949 to 63,825,000 gal. last year.

Tanker Deal Not Dead

WASHINGTON.—Investigation of a deal in surplus tankers purchased from the former Maritime Commission by a group including former Rep. Joseph E. Casey of Massachusetts, the late Secretary of State Edward R. Stettinius, Jr., and Adm. William F. Halsey will be revived in January when the Senate Investigations Subcommittee will open public hearings.

The purchase of the tankers by the group in 1947 through a company capitalized at $100,000 which borrowed $10,000,000 from an insurance company, leased them to Standard Oil Co. (N. J.) and sold out at a profit of $2,800,000, came to light last spring during investigation by a Senate banking subcommittee of favoritism and influence affecting the Reconstruction Finance Corp.

When Casey, called as a witness, challenged the subcommittee's authority to go beyond matters involving the RFC, the tanker deal was turned over to the investigations subcommittee, and investigators were immediately put to work on it *(The Oil and Gas Journal, October 18, page 74)*.

The hearings in January will go particularly into the "very important phase" of taxes collected on the tanker transactions, subcommittee chairman Clyde R. Hoey of North Carolina, said. The subcommittee also will try to ascertain whether there is a loophole in the tax laws which should be closed.

Pipe Procurement

PAD clarifies rules for drillers of 1 to 11 wells

WASHINGTON.—Drilling operators who normally put down 11 or fewer wells a year may continue to obtain oil-country tubular goods from their regular supply stores.

They will not be required to make their purchases at field warehouses of the Petroleum Administration for Defense, as some operators assumed. In some instances the nearest warehouse is several hundred miles from the operator, and purchases there would cause both inconvenience and added transportation costs.

Requirements. — For the benefit of operators not thoroughly informed regarding PAD requirements, the procedure to be followed by those drilling from 1 to 11 wells a year is summarized as follows:

1. The operator must file before the announced deadline a PAD-17 form, presenting his scheduled requirements for casing and tubing in the following quarter.

2. If the application for priorities assistance is granted, the operator will receive a letter from PAD setting forth the total tonnage of oil-country tubular goods he will be permitted to draw from stocks during the quarter and returning the PAD-17 form.

3. When the operator is preparing to begin actual drilling, he must file with PAD at least 15 days before the material is needed four copies of PAD-15 for each well programed. Specific authorizations of quantities will be made on the basis of the PAD-15 statements, and the operator will be given an allotment symbol to let him purchase casing and tubing from his regular supply store.

4. The operator must begin drilling within 30 days after he places his order and may not accept delivery of surface or intermediate casing earlier than 5 days before he installs it. Delivery of oil or flow string or tubing may not be accepted earlier than 72 hours before installation.

This procedure does not apply in the case of operators who are drilling wildcat wells and want to draw on PAD's 5 per cent field-warehouse reserve. Such operators must get their supplies from the warehouse rather than from regular sources.

WEST COAST

Not Enough Oil

More Gulf crude to help meet Pacific-area needs

WASHINGTON. — Plans for lifting a larger portion of Pacific-area oil requirements from Gulf Coast ports are under consideration in the Defense Department as a result of discussions late last month between officials of the Petroleum Administration for Defense and Armed Services Petroleum Purchasing Agency and representatives of West Coast oil companies.

A canvass of the situation during a conference held in Los Angeles November 28 disclosed that while refining capacity is adequate and an estimated 100,000 bbl. daily is idle, crude supplies are not adequate to meet both military and civilian needs. To meet all requirements it would be necessary either to import crude and products and pass the extra cost on to civilians in the area or divert military requirements from the West Coast to the Gulf Coast.

"Transportation of added-cost crude or products to the coast, since it would result in increases in price to the civilian and industrial consumer, seems inconsistent with price-stabilization objectives," Deputy Administrator Bruce K. Brown explained in reporting on the meeting.

"There is, moreover, no apparent justification for penalizing one section of the country because of a situation that has been created by a nation-wide military and defense program. It seems that where defense needs result in increases in cost those increases should be spread throughout the country, and the direct boost in prices should be absorbed by the military in their purchases in all areas, not just on the West Coast."

Long-term problem.—The problem of inadequate crude supply in California will remain, so long as military demands continue at their present levels or higher, Brown said.

There is a possibility of constructing a pipe line from either Alberta or Texas to augment crude availability, but this could not be done until important projects now under way are completed and the large-diameter pipe released, Brown added.

Tidelands Hearing Ordered

WASHINGTON.—The Supreme Court this week ordered Special Master William H. Davis to hold new hearings on the boundaries of seven areas involved in the California tidelands case which have been in controversy over the past several years.

The court failed to act on a Department of Justice recommendation for immediate court hearing and decision to settle the dispute.

FIELD CAMP.—An Aramco exploration party camped in the vast desert of Saudi Arabia. These parties operate hundreds of miles from their base in country which is virtually uninhabited.

Desert Oil Search

Aramco exploration team now looking for oil structures in uninhabited 300,000-sq. mile area in southern Arabia

Dahl M. Duff

ONE of the world's least known areas is a 300,000-sq. mile section of southern Saudi Arabia known as the Rub al Khali. Somewhat larger than the State of Texas, the Rub al Khali—literally "Unknown Quarter"—is a virtually uninhabited desert of sand dunes and gravel plains.

Early in September, Arabian American Oil Co. moved a three-party exploration team into the Rub al Khali as a part of its program of systematic investigation of the oil possibilities of the entire Saudi Arabian concession. This year, the area will be the scene of the company's most concentrated single exploration activity.

The exploration problem in the Rub al Khali, as elsewhere in Saudi Arabia, is one of logistics and communications. The parties will be working from 300 to 550 miles away from their home base at Dhahran. Supply is by both truck and airplane; communication is by radio.

Aramco's exploration season of about 9½ months begins in September and ends in June. During the summer months when the heat makes work virtually impossible, equipment is rehabilitated and personnel are given long vacations.

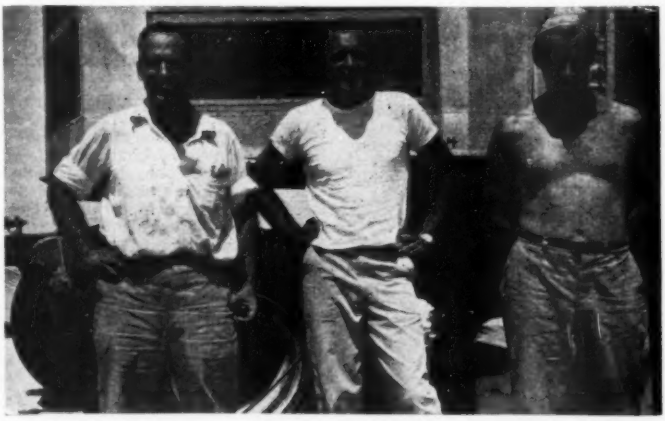
This year, Aramco will have 12 parties in the field, 3 of them working as a team in the Rub al Khali. Other geophysical, geological, and mapping parties will work in the Ras el Misha'ab area, around El Kharj in the Tuwaiq Mountains, and west of Ain Dar. In the far northwest part of the concession, Aramco parties will study the area crossed by the old Hejaz railroad, which was blown up by Lawrence of Arabia during the first world war.

The group working in the Rub al Kahli consists of a structure-drill party, a gravity meter and magnetometer party, and a vertical and horizontal control unit, all in charge of Ruel G. Gierhart, geologist. Normally, Aramco parties work separately, but because of the somewhat more difficult conditions, it was decided to combine the Rub al Kahli group into a single operating unit.

Personnel consists of 35 Americans plus about 200 Saudi Arabs. These latter include an escort detachment of soldiers which are supplied by the Saudi Arabian Government. Party staff members are brought back to Dhahran for a 6-day rest after each 5 weeks in the field. Most supplies and equipment needed in the operation go by the new Saudi Arab Government railroad to Ain Haradh and from there are taken by truck across the desert to wherever the headquarters of the party group may be located.

An Aramco DC-3 airplane makes two scheduled trips a week, carrying personnel, mail, and light cargo. As the parties work farther south into the region of high sand dunes, it is feared there will be increasing difficulty finding level areas where the plane can land. This will require party members to drive a considerable distance north to meet the plane.

A prime problem is water. One drilling unit works in advance of the



DESERT BOSSES.—Aramco's exploration activities in the Rub al Khali desert of southern Saudi Arabia are under the direction of this group. Left to right are Edward Elburg, triangulation field party chief; Fred L. Schenck, gravity-meter party chief; and Ruel Gierhart, geologist in charge of the operation. The men are shown in front of their trailer headquarters at a location about 240 miles south of Dhahran.

America needs your daily pound of scrap

IF every man, woman and child in America provided one pound of scrap each day, they would supply just about enough to produce the 105 million tons of new steel that the industry hopes to make in 1951.

Like yeast in breadmaking, scrap is essential to steelmaking. Scrap speeds up the process because scrap is already-refined steel. Every ton of scrap used replaces one ton of pig iron. Thus scrap also saves raw materials, because each ton of pig iron represents two tons of iron ore, one ton of coal and half a ton of limestone.

The continuing co-operation of every reader of this page is urgently requested to overcome a scrap shortage daily growing more critical. Turn in--by selling your scrap to regular scrap-gathering channels--any and all broken, worn-out or obsolete things made of iron and steel--machines, tools, pipe, boilers, structural parts and other "junk" you'll probably never use again.

Do your part in the campaign to help meet America's need for more steel. Enlist now for the duration. Remember that the scrap you furnish may help you get more steel.

YOUR SCRAP IS NEEDED — YOUNGSTOWN

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York
MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.

main group putting down water wells which enable the parties to move ahead. Drinking water can be trucked in along with other supplies.

Altogether, the three Rub al Khali parties form a caravan of some 50 vehicles, about 20 each in the gravity-magnetometer and structure-drill parties and the remainder in the mapping unit. Several air-conditioned trailers provide small offices and working room in the field.

During the 18 years Aramco and its predecessor has been operating in Saudi Arabia, highly specialized techniques have been evolved for traveling and working in the desert. Vehicles are equipped with oversized, low-pressure tires, extra-large cooling systems, auxiliary gasoline tanks, and compasses. Even so, and with continuous maintenance, about 2 years is considered the maximum useful life for the lighter vehicles.

The exploration program being carried forward is in accordance with Aramco's obligations under terms of the concession agreement. During the last 2 years the company has completed its offshore geophysical work in the submerged areas of the Persian Gulf included in its concession. In this operation, seismograph as well as the other exploration techniques were employed. The technical side of the gravity-meter work is handled by Robert H. Ray Co. Geophysical Service, Inc., does the seismograph work both over water and in the land areas where it is used.

A.I.O.C. Speaks Up

Board Chairman Fraser flays Iranian distortion of facts, presents company's case in first full statement on dispute

Dahl M. Duff

THE first full statement by Anglo-Iranian Oil Co., Ltd., regarding nationalization of its properties by the Iranian Government was made in the company's annual report last week.

Sir William Fraser, Anglo-Iranian chairman, reviewed in detail the events leading up to the Iranian nationalization law of March 20 and the subsequent developments, including the two abortive efforts to negotiate a settlement in Teheran, the placing of the case before the International Court of Justice and the United Nations, and the final evacuation of the British staff from Abadan.

Accusations made by the Iranian Government against the company have, by distortion of facts, presented the company in a completely false light to the world, he said. "No one shred of evidence has been or can be produced" by the Iranian Government to support its charges that the company has been guilty of falsification of its accounts, that it has used political interference to further its interests in Iran, that it has encouraged administrative corruption in the Iranian Government, and that it has undermined the independence of the Iranian nation.

Case for A.I.O.C.—In his summary of the dispute with the Iranian Government, Sir William made the following points:

1. The supplementary concession-revision agreement proposed by the company and rejected by the Iranian Parliament in 1949 and again in 1950 was then the most advantageous offered to any country then producing oil in the Middle East.

2. The company's initial failure to attempt to explain the supplemental agreement was due to the fact that the Iranian Government regarded it as its own responsibility to inform public opinion on an issue of such importance to Iran.

3. The company's large-scale development program in Iran, which included the building up of Abadan to the largest and one of the most modern refineries in the world, was undertaken and pursued on the basis of unequivocal undertakings by the Iranian Government neither to annul the 1933 concession nor to alter its terms by unilateral action.

4. Despite the developments in Iran, Anglo-Iranian continues to hold extensive interests outside that country. The company now has at its disposal crude production at the rate of about 20,000,000 tons (400,000 bbl. daily) principally in Kuwait and Iraq. By the end of next year, its refinery capacity, including the new Kent plant in England, should be more than 20,000,000 tons.

5. The way in which supply problems arising from the stoppage of shipments from Iran were met is a "remarkable tribute" to the resourcefulness and flexibility of the world oil industry. Sir William said the great effort made by other oil companies on both sides of the Atlantic deserves recognition and that he particularly wished to acknowledge the fact that the major part of the oil purchased in the emergency came from American sources.

6. Anglo-Iranian's trading profit of £81,300,622 ($227,641,741.60) is the highest in the company's history, but it results not only from Iranian operations but from substantial activities outside Iran on which the Iranian operation depended entirely.

Sir William said that Iranian nationalization had injured gravely the company, but that it had hitherto preserved silence in order not to embitter further its relations with the Iranian Government.

History of dispute. — The company took the initiative in 1948 in offering higher payments to the Iranian Government. When the policy of dividend limitation was introduced in Britain and unfavorably affected current royalty payments to Iran, the company offered to make an immediate additional payment to obviate this hardship. In the ensuing discussion, the validity of the 1933 agreement was never questioned by the government, nor did the company hold back from offering substantial revisions.

The later governments in Teheran never made more than "sporadic efforts" to publicize the terms of the agreement, and at no time did the agreement receive the benefit of a detailed or objective examination from the Majlis (lower house of the Iranian Parliament).

Later, at the request of the Iranian Government, the company's information department in Teheran placed full information at the disposal of the press and interested parties in Iran, but by that time propaganda of the National Front (the party of Prime Minister Mossadegh) had gained firm hold and few were ready to be receptive to a factual appraisal of the agreement Sir William said.

During the negotiations over the supplemental agreement, a 50-50 profit-sharing plan was considered but was discarded. The Iranian Government's representatives took the position that such profit sharing should apply to all activities of the company, both inside and outside Iran. No oil company in the world, Sir William commented, could agree to a 50-50 principle, unless the plan was confined to profits arising within the country itself.

Outside Iran.—In his review of company activities in 1950 outside Iran, Sir William reported that exploration is continuing in other parts of the world, including Papua, Simily, Nigeria, and Trinidad.

In Qatar, a lower formation was developed in 1950, and at the end of the year this was accounting for 20 per cent of company production.

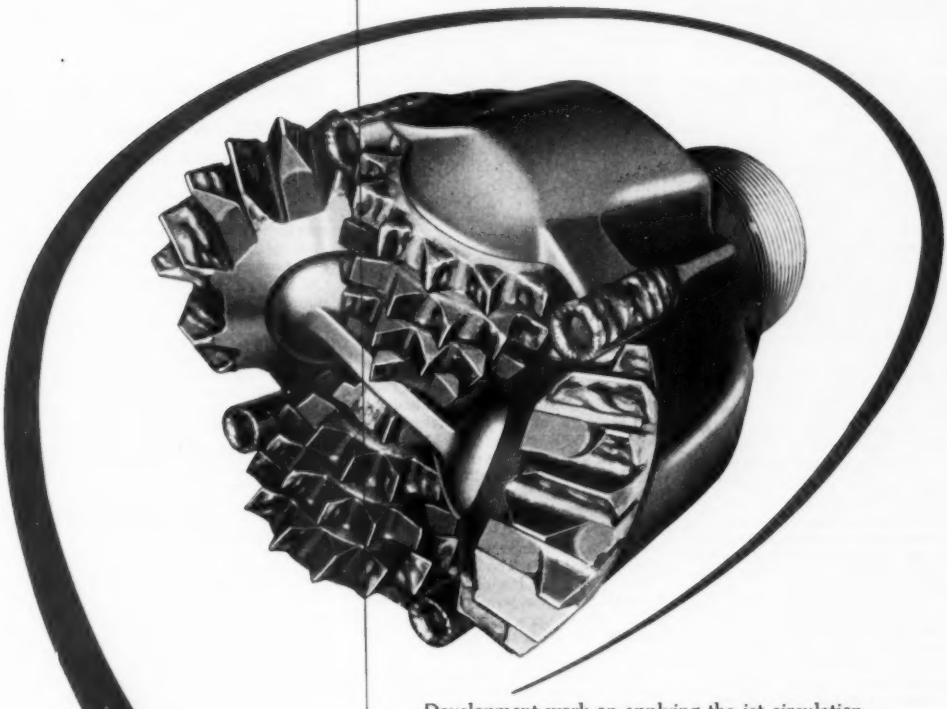
The fleet of British Tanker Co., Anglo-Iranian's shipping affiliate, is one of the largest in the world with 153 vessels of 1,854,000 dw. tons. Including chartered tonnage the Anglo-Iranian total is more than 300 ocean-going tankers.

The £81,300,622 trading profit for 1950 compares with a 1949 profit of £38,666,485 ($108,266,158) and is after provision of £34,195,372 ($95,747,041) for depreciation on fixed assets, oil-exploration interests, and survey repairs. The gross profit of £115,495,994 ($323,388,783) compares with £63,020,405 ($176,457,134) the previous year and results from all the activities in which the company is interested.

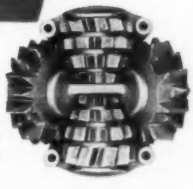
JET TYPE CIRCULATION:

A DEVELOPMENT BEGUN BY SECURITY

3 YEARS AGO...



Development work on applying the jet circulation principle to roller cutter rock bits was begun by Security's engineers three years ago. In February of 1949 Security's first jet bit was introduced for use in the West Texas fields. Wide acceptance resulted as drilling rates increased when Security Jet Bits were used. Today, these bits have unexcelled efficiencies due to the exclusive location and effective construction of the jet nozzles determined during years of exhaustive tests.



Security Jet Bits for use in clay, sticky shale, rubbery shale, medium hard shale, conglomerate, gyp, red beds, anhydrite and other formations where circulation is a prime factor in performance.

GET Security IN DRILLING

ONE OF THE DRESSER INDUSTRIES

SECURITY ENGINEERING CO., INC.

Main Office and Plant: Whittier, California
Branches in all major producing areas
Export Office: Chanin Building, New York City

ROCK BITS • REAMERS • HOLE OPENERS • CASING SCRAPERS • SECURALOY

New Colombian Strike

International Petroleum's Totumal wildcat in middle of Magdalena Valley flowing oil from Cretaceous formation

INTERNATIONAL PETROLEUM CO. of Colombia has made an apparently important oil discovery with its Totumal wildcat about 75 miles north of the former De Mares concession area in the middle of the Magdalena Valley of Colombia.

The well, which was spudded in July 2, flowed 550 bbl. of oil through ½-in. choke on a 12-hour test. Gravity of the oil was 25°. Total depth was 7,215 ft. with 8⅝-in. casing cemented at 6,740 ft. The test was made over a 475-ft. total section above total depth.

Production was from fractured limestone and shale of Cretaceous age. Only other Cretaceous production in Colombia is in the Barco concession of Colombian Petroleum Co. in the eastern part of the country adjacent to the Venezuelan border.

May go deeper.—Reports were that Totumal 1 would be drilled deeper. The company was making plans to drill other wells in the area in the near future. International of Colombia is a subsidiary of International Petroleum Co., Ltd., headquartered in Coral Gables, Fla.

The International organization gave up Colombia's major producing property, the De Mares concession, last August when it reverted to the government at the expiration of a 30-year term. International continues to operate the Barrancabermeja refinery under lease, but a government company, Empresa Colombiana de Petroleos, is producing the fields with the technical assistance of International.

WILDCAT STRIKE.—Map showing location of International Petroleum's successful test.

International now has no production in Columbia.

Active wildcatting.—The Totumal operation is one of several wildcats which have been drilled by International and other companies in Colombia during the last year in what amounts to a revival of exploration work in the country. Sixteen rigs have been running in the country—two by International of Colombia, four by Shell, one by Richmond Exploration Co., five by Texas Petroleum Co., and four by Colombian Petroleum Co. Texas Petroleum, as the most active exploratory operator in Colombia, has had favorable shows in its Boyaca wildcat as well as successful wells in its Tetuan block. In the Barco, Colombian Petroleum's Sardinata 2 test is reported to have shown for high-gravity oil production.

International of Colombia (Intercol), which succeeded Tropical Oil Co., had its other rig drilling the Balsamo well near the Magdalena River north and west of Shell's Dificil field. This test was finally abandoned November 15 at a depth of 10,706 ft. It is reported to have tested oil below 9,300 ft., and further drilling is in prospect in the area. A group of International and Standard Oil Co. (N.J.) officials who visited Bogota in August said that the company had set up a sizable budget for exploration work in Colombia next year.

The Totumal discovery well is located about 10 miles east of the Andian pipe line and about 25 miles south of the South American Gulf line. The former moves De Mares crude to the Caribbean coast, and the latter handles production from the Barco concession of Colombian Petroleum. The Totumal concession was granted by the government last June and consists of 49,938 hectares or about 124,000 acres.

Burma Agreement Announced

An agreement between the Burmese Government and Burmah Oil Co., Ltd., under which the government will acquire a third interest in B.O.C.'s Burmese operations has been announced in Rangoon.

The agreement follows negotiations in Rangoon between government officials and W. E. V. Abraham, managing director of B.O.C. It calls for a British loan of £2,500,000 towards the government purchase of a £5,000,000 share in a new local company. This will represent a third of the total capital of the company. B.O.C., the leading Burmese company, now operates three Burmese subsidiaries—Burma Concessions, Burmah Oil Co. Pipelines, Ltd., and Burmah Oil Co. Refineries, Ltd.

The Burmese oil industry, which prewar produced and refined 20,000 to 25,000 bbl. daily, has regained little of its former importance. Civil disturbances in the country blocked attempts of the company at reconstruction. However, internal conditions in Burma have improved in recent months.

Refinery for India

Standard-Vacuum to build 19,000-bbl. Bombay plant

PLANS for the construction of three refineries in India have taken more definite shape with the conclusion of an agreement between the government and Standard-Vacuum Oil Co. for construction of one of the plants.

Reports of the Standard-Vacuum agreement were confirmed by the New York headquarters of the company which said the refinery would be built in the Bombay area at a cost of $35,000,000 and would have a capacity of about 19,000 bbl. daily.

Similar agreements for refinery construction are expected to be signed in the near future with two other companies, Caltex and Burmah-Shell. Capacity of all three plants will be about the same.

First big investment.—The Standard-Vacuum agreement was important not only in the petroleum industry but also as the first significant foreign investment in India. The terms agreed to by the government, including a 25-year guarantee against expropriation, represent a change from the nationalistic views expressed by Indian officials after the country's independence in 1947.

Under the agreement, Standard-Vacuum will incorporate an Indian rupee company in which 25 per cent of the capitalization on a preferred-stock basis will be offered to Indian nationals. Formerly India demanded that 51 per cent of foreign investments be held by Indians.

The government has agreed to make available foreign exchange for remission of profits, to exempt crude from customs, and to allow the importation of equipment at a special low 5¼ ad valorem rate. Products will be sold on the Indian market at prices equal to that of imported supplies. The company will train Indians in refinery operation and will make refinery byproducts available for other Indian industries.

To use Persian Gulf crude.—Standard-Vacuum's announcement said the refinery probably will use Persian Gulf crude. It will be several months before process designs are completed,

the company said. It is expected the refinery will be placed in operation not later than 1956.

A party of Standard-Vacuum technicians has already arrived in Bombay to plan improvements to docking and harbor facilities near the proposed site. In New Delhi, it was said that the company would also spend about $500,000 on housing.

India is the second country in which a major buildup of refinery capacity has been projected since the shutdown of the Iranian oil industry. Shell, Standard - Vacuum, Anglo-Iranian (through Commonwealth Oil Refineries), and Caltex all are planning important new refineries in Australia.

Dependent on Abadan.—India in the past has been heavily dependent on the Abadan refinery for its petroleum and was supplied only by emergency measures after the nationalization in Iran. The country has only one refinery at present, the 5,750-bbl. daily refinery of Assam Oil Co., Ltd. (Burmah Oil Co., Ltd.) at Digboi in Assam, which processes indigenous production. Standard - Vacuum, Burmah-Shell, and Caltex are the three leading oil-marketing companies in India and as such were the logical organizations to whom the Indian Government turned in its proposals for refinery construction.

Communist Buyers?

Desperate Iran continues search for crude markets

IRANIAN Deputy Prime Minister Fatemi said last week in Teheran that Iran is prepared to sell oil to the Communist countries of eastern Europe "as soon as the necessary formalities are completed."

Iran, he said, views the sale of its oil as an economic and not a political matter and therefore does not consider relevant the political views of its customers. He said the former purchasers from Anglo-Iranian have had plenty of time to make offers, but none have been forthcoming.

Under the Iranian nationalization law, former customers of Anglo-Iranian were to be given preference in purchases from the National Iranian Oil Co. These were mainly the large international oil companies whose sympathies definitely lie with Anglo-Iranian. The fact that they have shown no interest in dealing with the nationalized company explains Fatemi's remark that Iran now feels "legally free" to sell its oil where it pleases.

Egyptian agreement.—Another report bearing on Iran's possibilities of selling oil came from Cairo, where Iranian Prime Minister Mossadegh spent several days on his return trip to Teheran from the United States. There, the acting Egyptian foreign minister said oil officials of the two countries had reached an agreement under which Egypt would import Iranian oil. Like Iran, Egypt has undertaken strong anti-British action in its case over the Suez Canal treaty question.

From Basra, Iraq, came a recent report that an American ship had unloaded lubricating oil at the Iranian port of Khorramshahr near Abadan. The ship was identified as the "Steel Architect" and was said to be the second to arrive with lubricants. The first was the "American Robin."

Only important petroleum product which Iran needs to import is lubricating oil. At the time of the nationalization, Anglo-Iranian had virtually completed an 800-bbl. daily lubricating oil plant at Abadan, but it was never commissioned. The Iranians apparently have had no success in getting it into operation, contending that certain drums cracked.

McCarthy Sees Egypt's O.K.

Arriving in New York last week from Europe, Glenn McCarthy, Houston operator, expressed confidence the Egyptian Government would soon enact legislation enabling him to buy into National Petroleum Co. of Egypt and begin exploratory work in that country.

The company is a private firm which holds permits on some 121 exploration blocks in Egypt. In Cairo last week, Dr. S. De Lazovert said he, McCarthy, and a Swiss financial firm, Hofman Bank of Zurich, had formed a syndicate and agreed in principle to buy 51 per cent of the stock of the Egyptian company.

Dr. De Lazovert said the agreement hinges on certain guarantees from the Egyptian Government, one of which is amendment of the law requiring that Egyptians hold 51 per cent of the stock of any company developing Egyptian oil. This and other restrictive features of Egypt's law have stopped Socony-Vacuum and Shell from further exploration in Egypt and were a major factor in causing the withdrawal of Standard Oil Co. (N.J.) from the country several years ago.

Kuwait 50-50 Deal Signed

The conclusion of a new 50-50 profit-sharing agreement with the Shaikh of Kuwait was announced December 3 in London by Kuwait Oil Co., Ltd.

K.O.C. said that the shaikh's revenue would be substantially increased under the new agreement, which was effective December 1. Its announcement gave no details, but it has been reliably reported in the industry that the new Kuwait contract would increase total government payments from the present slightly more than 9 cents a barrel royalty to between 49 and 50 cents.

It is understood K.O.C.'s present basic royalty will remain unchanged and that the company will pay income taxes which will give the shaikh an equal share of the profits. K.O.C. said it also had agreed to contribute to the cost of educating Kuwaitis in schools outside the shaikhdom.

Kuwait's production reached a new record in October, averaging slightly more than 711,000 bbl. daily. Under the reported terms of the new agreement, this rate of production would give the shaikh a daily revenue equal to about $350,000.

International Briefs

A Brazilian Government plan to organize a new company to explore for and develop oil in the country has been reported in Rio de Janiero. The majority leader of the Brazilian House of Deputies said the government's proposal would soon be sent to Congress. Formation of the company, to be financed by the government, was said to be part of a new 5-year plan for greater development of Brazilian oil resources. At present, foreign companies are prevented by law from carrying on exploration and development work in Brazil.

An oil discovery is reported to have been made recently by the Turkish Government organization in Eastern Anatolia about 25 miles from Rahan. No details were available. The only production at present in Turkey is in Ramandag field in the southeastern part of the country where proved reserves are, according to a recent publication of the Turkish Information Office, 18,000,000 tons with over-all estimated reserves reaching 80,000,000 tons.

Construction work has been started on a new 3,500-bbl. daily atmospheric-distillation unit for Manchester Oil Refinery, Inc., at Trafford Park, Manchester, England. The new unit will operate in conjunction with an existing vacuum tower. It was described as the first step in an expansion program which will raise the plant's throughput to about 150,000 tons or 3,000 bbl. daily.

A new plant for the manufacture of detergent Teepol has been opened near the Petit-Couronne refinery of Cie. Raffinage de Shell-Berre in northwestern France. The operating company for the detergent plant is Soc. Shell Saint-Gobain, composed of Shell and the French chemical company, Saint-Gobain. The plant has a capacity of 25,000 tons annually and draws its cracked petroleum - wax feed stock from the Petit-Couronne refinery.

Condor, S.A., has begun construction of an 83-mile, 12-in. crude-oil pipe line from Genoa and Rho, near Milan, Italy. Contract has been awarded to Italian constructors.

PERSONALS

In Tenth Year

Plantation system expands under direction of Younts

PRESIDENT of Plantation Pipe Line Co., now the operator of the world's largest-capacity products pipe line, is Charles Rolphi Younts, who has headed the company since its organization 10 years ago.

Dedication of Plantation's expanded system December 4 marked the end of the firm's transition from the operator of the largest-capacity line in the southeastern states to that of the largest-capacity line in the world (see article beginning on page 106 of this issue).

Younts began his career in 1912 as an office boy for Standard Oil Co. (N. J.) and except for a period of military service in World War I, his entire business career has been with Standard, its subsidiaries, and affiliates.

From 1912 to 1941 he advanced in Jersey marketing operations through positions of district manager and wholesale manager in the Carolinas and Virginia. His later service led to becoming division manager of the combined Rochester, N. Y., and Metropolitan New York division with headquarters at New York.

In 1941 he left the position of assistant division manager of the New Jersey division to become president of the newly formed Plantation Pipe Line Co.

As president and director of the firm, Younts has full responsibility for the efficient and economic operation of the company.

Born at Pineville, N. C., his early education was at Bethany Preparatory in South Carolina. He graduated from Baird's University in North Carolina.

In the wide range of his civic, educational, scientific, and religious organization activities, he is director and past president of the Atlantic Y.M.C.A., vice president of the Southern Association of Science and Industry, Inc., and Member of Session, Association Reformed Presbyterian Church, Doraville, Ga.

Burtner Fleeger, Forrest H. Lindsay, and **Bailie W. Vinson,** of National Associated Petroleum Co., were hosts November 30 in Tulsa to **Pierre David-Weill,** senior partner of Lazard Freres & Co. of Paris and New York, and **Henry C. Brunie,** president of Empire Trust Co. of New York.

Dr. Louise B. Freeman, geological consultant at Lexington, Ky., has opened another office at Corpus Christi, Tex.

James M. Cunningham, consulting geologist at Baton Rouge, La., has moved his offices to Lafayette, La.

Leslie E. Goss, assistant district petroleum engineer for Humble Oil & Refining Co. at Encino, Tex., has been transferred to Corpus Christi, Tex., as petroleum engineer in charge of drilling practice.

Warren D. Phelps, petroleum engineer in Magnolia Petroleum Co.'s Cushing district, has been transferred to the Oklahoma division offices at Oklahoma City. **Mertz Ratliff** has been promoted to construction foreman in the firm's Kermit, Tex., producing district.

A. H. Barbeck has been appointed chief engineer of the Oil and Gas Division of the Texas Railroad Commission, succeeding **Jack Baumel,** who is resigning January 1 to become technical adviser to the Venezuelan Government in oil and gas matters. **George Singletary,** senior engineer and examiner will become assistant to Barbeck.

Dr. N. N. Greenman, geologist for Shell Oil Co., has been transferred from Los Angeles to the exploration and production technical division at Houston. Other changes include: **L. E. Lacy,** production foreman, transferred from Quitman, Tex., to Kilgore, Tex.; **W. A. Fletcher,** production foreman, transferred from Kilgore to Quitman; **R. A. Harrington,** gas mechanical engineer, transferred from Houston to New York; **H. K. McKinnon,** exploitation engineer, transferred from Houston to The Hague; **W. J. Wilson,** stratigrapher, transferred from Tyler, Tex., to Corpus Christi; **J. R. Patterson,** exploitation engineer, transferred from Kilgore to Houston; and **W. R. Lund,** exploitation engineer, transferred from Houston to The Hague.

Carey C. Morgan, Jr., junior mechanical engineer for Stanolind Oil & Gas Co. at the Salt Creek gasoline plant, Midwest, Wyo., has been transferred to the Slaughter gasoline plant at Sundown, Tex., and promoted to plant chemist.

Robert W. Bybee, senior geologist for Humble Oil & Refining Co., has been transferred from Houston to Midland, Tex., as West Texas division exploration geologist. **Roy Huffington** has been transferred from Midland to Houston replacing Bybee.

Edward McNeil, assistant treasurer of Standard Oil Co. (N. J.), has been elected a vice president of Standard Oil Co. of Brazil, an affiliated company, and has taken up his new duties at Rio de Janeiro. McNeil has been associated with Jersey Standard and its affiliates for more than 34 years and has served as a director of several of its affiliates.

E. W. Briggs, party chief for Continental Oil Co., has been transferred from Walden, Colo., to Las Vegas, N. M.

Thurman Pinkerton, formerly a petroleum engineer in Magnolia Petroleum Co.'s Gulf Coast division office at Houston, has been transferred to the Cushing producing district with headquarters at Drumright, Okla.

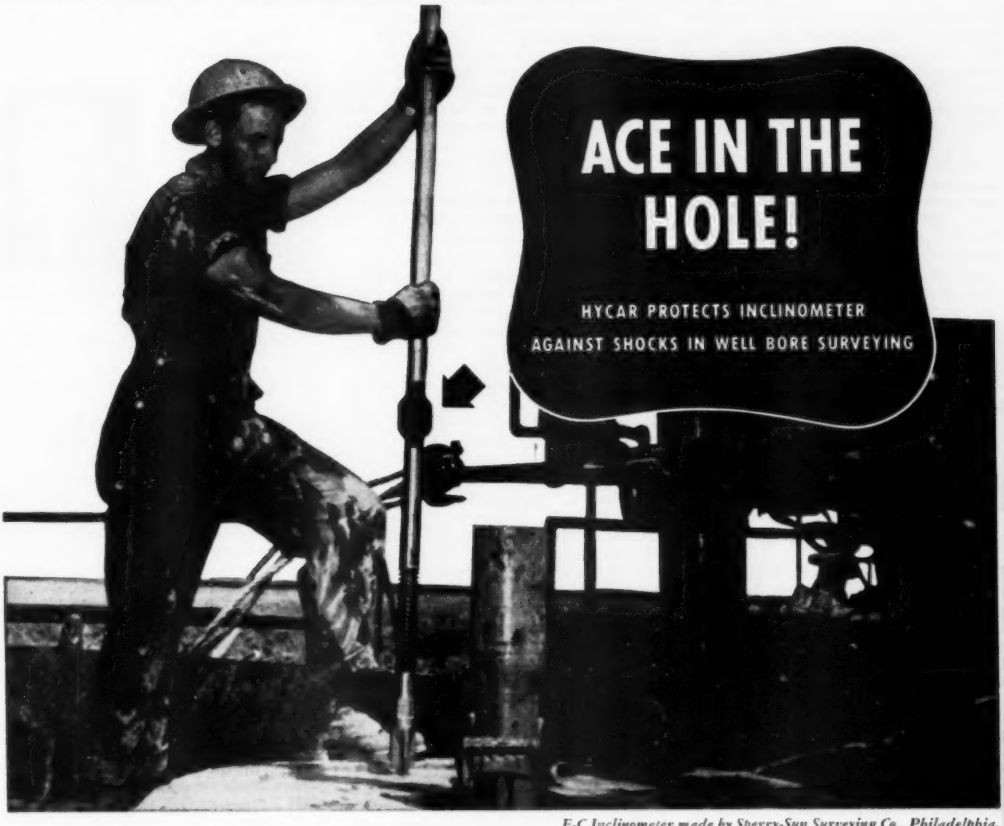
W. T. Hudson has resigned as geologist for The California Co. at Ardmore, Okla., to join British American Oil Producing Co. at Denver in the same capacity.

Robert K. James, petroleum engineer at Lake Charles, La., for Magnolia Petroleum Co., has been transferred to the Gulf Coast division offices at Houston.

Carl S. Dickens, superintendent of Magnolia Petroleum Co.'s product lines between Fort Worth and Oklahoma City, has retired after 44 years of service, closing the longest service record in company personnel. **J. W. Fulbright,** assistant to the manager of refineries at Beaumont, Tex., will retire on December 31 after 43 years of service, the second longest service record. Both men started work with ancestor companies of Magnolia and in 1912, following the organization of Magnolia, were transferred to the Beaumont refinery. Here they served together until Dickens was shifted to

Another new development using

B. F. Goodrich Chemical Company ***raw materials***



E-C Inclinometer made by Sperry-Sun Surveying Co., Philadelphia. Hycar fin-guides made by Murray Rubber Co., Houston.

WHEN the Inclinometer pictured is dropped into the drill pipe to measure the "straightness" of the hole, it makes a punishing trip. Besides passing through the abrasive drilling fluid at terrific speed, it must also pass hundreds of pipe joints—take thousands of shocks.

Taking up those shocks is the job of the Hycar rubber fin-guides. And they do it to perfection. For Hycar has exceptional abrasion resistance—can absorb repeated shocks and come back for more!

Moreover, Hycar's outstanding resistance to gas, oil, chemicals and other damaging conditions makes it ideal for the job—as it is for so many in the petroleum industry.

Hycar rubber compounds are used in many applications, in many fields. They may be just what you need to improve or develop a product—to accomplish new savings in time and money. Demand for Hycar exceeds supply, but limited quantities available for development work. For technical bulletins and helpful advice, please write Dept. HF-13, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Need high tensile strength? Hycar has it—plus abrasion resistance and more advantages.

Hycar
Reg. U.S. Pat. Off.
American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors

PERSONALS

Corsicana, Tex., in 1936 as superintendent of the refinery there. When the plant suspended operations in 1941, Dickens was transferred to his most recent position. Fulbright became assistant to the manager in 1915.

D. R. Johnson, manager of Continental Oil Co.'s manufacturing department with headquarters at Ponca City, Okla., will move to Houston on January 1 as executive headquarters representative of the company's manufacturing department. He will continue as department manager. **Charles**

D. R. JOHNSON

C. D. HULL

D. Hull, superintendent of the company's Ponca City refinery, has been promoted to the newly created position of manager of the refinery. Johnson joined Continental in 1924, and Hull has been with the firm since 1919.

Charles E. Maschal, manager of the Marcus Hook refinery of Sun Oil Co., recently received an alumni citation from Drexel Institute of Technology for his civic contributions and professional accomplishments.

John E. Kelderhouse has been appointed district secretary for the newly created North Central district of the Liquefied Petroleum Gas Association with headquarters in Chicago.

R. T. Harris, who has been with The Texas Co. since 1927, has been promoted to assistant to the manager of the Rocky Mountain division, producing department. **R. M. Harris** will succeed R. T. Harris as division accountant at Denver.

F. E. Hatfield has been appointed executive assistant to the vice president, **J. F. Adams,** and manager of supply and services in the Fort Worth, Tex., offices of Gulf Oil Corp. Other changes and appointments include: **G. H. Fisher,** appointed vice president for exploitation and manager of exploration; **C. D. Condry,** promoted to division staff geologist; **J. D. Moody,** appointed division geophysical supervisor; **K. W. Paul,** appointed administrative assistant for exploration; and **T. Q. Williams,** named assistant fiscal adviser to the vice president.

William E. Horkey, formerly exploitation engineer and geologist for British American Oil Producing Co., has joined Arrow Drilling Co. at Tulsa. Prior to joining B-A in 1943, Horkey had been with the old Superior Oil Corp. for many years.

W. G. Tierney, executive vice president and general manager of Derby Oil Co., has been elected a director to fill the vacancy created by the resignation of **H. E. Zoller.**

Raymond T. Stotler, Jr., geologist for Stanolind Oil & Gas Co. at Calgary, Alta., Canada, has been transferred to Tyler, Tex., and promoted to district geologist.

R. D. Schropp, engineer trainee for Phillips Petroleum Co., has been transferred from Odessa to Big Spring, Tex., and promoted to production engineer.

Walter G. Baskerville, of Western Oil & Fuel Co., Minneapolis, has been elected a director of International Refineries, Inc. Other directors elected include: **Cedric H. Smith,** of Eastman, Dillon & Co., Chicago; **William P. Smallwood,** First Southwest Co., Dallas; and **George C. Wright,** Minneapolis, of Northfield & Southern Railway Co.

T. E. Davie, who has been in the geological department of the Gulf Coast offices of Amerada Petroleum Corp., has been transferred to Tulsa.

MASTON NIXON

Maston Nixon last week was named president of Southern Minerals Corp., and Southern Pipe Line Corp., succeeding **Clarence M. Brown,** former president, who was made chairman of the board. Nixon, widely known Corpus Christi, Tex., oil man, is a director of the American Petroleum Institute, Independent Petroleum Association of America, Texas Independent Producers and Royalty Owners Association, and is past president of the Texas Mid-Continent Oil and Gas Association. Southern Minerals, an oil-producing company, and Southern Pipe Line are jointly owned by Pittsburgh Plate Glass Co. and American Cyanamid Co.

Charles R. Wilke, associate professor of chemical engineering at the University of California and formerly with Union Oil Co. of California, has been named the winner of the Junior Award of the American Institute of Chemical Engineers. The honor is given for outstanding contributions to the literature of chemical engineering.

E. E. SOUBRY

D. A. SHEPARD

Emile E. Soubry, who has been a director of Standard Oil Co. (N. J.) since 1949, has been elected a vice president of the company, and **David A. Shepard,** who has been executive assistant to President **Eugene Holman** since 1949, has been elected a director. Soubry has been with the company and its affiliates in the United States and abroad for the past 40 years. He started in 1911 as a clerk in the shipping department of Anglo-American Oil Co., Ltd., now Esso Petroleum Co., Ltd., in London. Shepard joined the firm in 1927 as a research engineer immediately after his graduation from Massachuetts Institute of Technology.

W. J. Wagner, mechanical engineer for Shell Oil Co., has been transferred from Bakersfield, Calif., to the Los Angeles Basin division at Long Beach. **G. H. Holliday,** formerly safety engineer in the Los Angeles regional offices, was transferred to Bakersfield as mechanical engineer for the San Joaquin division.

F. W. Scheineman, assistant chief engineer of the manufacturing department of Standard Oil Co. (Ind.), has been promoted, effective January 1, to chief engineer. He will succeed **D. A. Monro,** whose appointment as manager of the company's purchasing department has been previously announced. **Dr. F. H. Blunck,** superintendent of the projects division at Standard's Whiting, Ind., refinery, will be advanced January 1 to a new position in the general office manufacturing department as manager of the projects, capital expenditures, and miscellaneous-contracts division. Other personnel changes made last week were: **C. A. Cogan,** section supervisor, appointed to a new position as superintendent of the projects, capital expenditures, and miscellaneous-contracts sections; **F. C. Smith,** section supervisor, became superintendent of the operations and cost control sections, a new position; and **W. N. Bercaw,** personnel section supervisor, was appointed superintendent of the personnel section.

PERSONALS

Preston G. Rennie, reservoir engineer for Sohio Petroleum Co. at Oklahoma City, has been transferred to Russell, Kans., as production engineer.

W. F. Smith, II, formerly vice president and secretary of Albercan Oil Corp., a subsidiary of Canada Southern Oils, Ltd., has formed Somerset Oils, Ltd., with headquarters in Calgary, Alta.

A. G. Cockrill, general manager of Anglo-Canadian Oils, Ltd., of Brandon, Man., has been elected vice president of the company.

James J. McGrory, formerly engineer in the operations-analysis department of Esso Standard Oil Co.'s Bayway refinery at Linden, N. J., has been promoted to technical assistant in the process department's cracking division.

T. D. Mundorf and **Theodore Arthur Topper** have joined the geological staff of Plymouth Oil Co. at Billings, Mont.

A. F. Driskill, superintendent of drilling for Iraq Petroleum Co. at Kirkuk, Iraq, has been transferred to Long Beach, Calif., in an advisory capacity.

C. A. Langner, petroleum engineer for Humble Oil & Refining Co. at New Orleans, has been transferred to Katy, Tex., as gas engineer.

Frederick L. Smith, formerly with Northern Trust Co. at Chicago, has joined Stanolind Oil & Gas Co. at Glasgow, Mont., as geophysicist.

Tom G. Calhoun, II, junior petroleum engineer for Stanolind Oil & Gas Co., has been transferred from North Cowden to Midland, Tex.

E. A. Ballman, of Shell Oil Co. of Canada, has been promoted from assistant manager of the gas department, to manager of the cracking department at the Montrea. East refinery. **G. Shane,** formerly assistant chief technologist at Montreal, has been transferred to the Shellburn refinery at Vancouver, B. C., as chief technologist.

Hal Bybee, division geologist in Abilene, Tex., for Continental Oil Co., has been promoted to division geologist at Wichita Falls, Tex., and **Arden Kersey,** district geologist at Amarillo, Tex., has been transferred to Abilene and promoted to division geologist there, succeeding Bybee. In two other changes **George W. Marshall, Jr.,** geologist at Midland, Tex., has been promoted to assistant to the area geologist at Fort Worth, and **G. H. Galny,** geologist at Wichita Falls, has been promoted and transferred to Fort Worth as geologist.

Charles Ralph Thomson has been appointed superintendent of Canadian operations for Sohio Petroleum Co. Thomson, who graduated from the University of Oklahoma in 1950, has had many years of experience in drilling and operating in western Canada. Prior to joining Sohio he was a petroleum engineer for Socony-Vacuum Exploration Co. in the Far North.

J. D. Walters, formerly petroleum engineer for South Penn Oil Co. at Bradford, Pa., has joined Sunray Oil Corp. at Tulsa as petroleum engineer.

F. A. Schurtz, exploitation engineer for Shell Oil Co., has been transferred from Houston to Casper, Wyo., where he is a senior exploitation engineer in the Rocky Mountain division.

Gene Wegner, tool pusher for Helmerich & Payne, Inc., at Elk City, Okla., has been transferred to Watford City, N. D., as superintendent.

T. A. Abbott will be appointed to a new position as manager of the engineering-research department of Standard Oil Co. (Ind.) January 1. **Dr. R. B. Jacobs** will be appointed to a new position as technical director of the department.

W. A. Watson, assistant district superintendent for Humble Oil & Refining Co. at Odessa, Tex., has been transferred to Snyder, Tex., in the same capacity.

Robert S. Baker, mud engineer for Phillips Petroleum Co., has been transferred from Odessa, Tex., to Pauls Valley, Okla.

A. M. Knouse, party chief for The Texas Co. at Sterling, Colo., has been transferred to Denver and promoted to seismologist.

Peter C. Henry, area production superintendent for Gulf Oil Corp., has been transferred from Luling to Pierce Junction, Tex.

DEATHS

J. A. Gibson and **Chester Liebman,** operators of Liebman-Gibson Drilling Co., of Alice, Tex., were killed in a plane crash near Corpus Christi, Tex., on November 25.

W. B. Ferguson, 65, independent geologist of Brenham, Tex., who is credited with the discovery of Clay Creek field, Washington County, Texas, in 1925, died November 24.

Mrs. Joyce Richardson Wolfe, 48, one of the few women wildcatters, died November 28 at Houston. She was one of the few operators to have an oil field named for her. The field, called Joyce Richardson field, is in the Ogburn area of Harris County.

Frank A. Billstone, 70, former treasurer and director of Ohio Oil Co., died November 26 at Findlay, Ohio. On his retirement in 1946, Billstone had been with the firm more than 42 years, rising from a clerical position to guide its accounting and financial affairs.

Fred Greenweld, 61, retired drilling contractor, died November 22 at Santa Ana, Calif.

Timothy A. Pedley, Sr., 87, retired Denver oil man, died there November 21. He was treasurer of Midwest Refining Co. until it was acquired by Standard Oil Co.

David Smith Kilgour, 60, secretary of the Western Oil and Gas Association, died November 24 at Los Angeles.

Hugh Conner, 63, production superintendent for Gordon Oil Co. at Mount Pleasant, Mich., died November 27 at Detroit. He had been with the firm since 1920.

David Nisbet Dunn, 77, died recently at Sarnia, Ont. His extensive experience as a driller included service in Borneo and Alberta.

George Ferguson, 76, formerly of Petrolia, Ont., died recently in Alexandria, Egypt. In 1908 Ferguson took a drilling contract for Shell Oil Co. in Egypt and became a refinery superintendent there, retiring in 1931.

Wallace O. Dunham, retired oil operator, died recently at Columbus, Ohio. He was a drilling contractor in Ohio, Michigan, Kentucky, and West Virginia oil fields and was one of the organizers and operators of the Titus & Dunham Oil Co. in West Virginia.

Grover Simpson, 59, retired vice president of Loffland Brothers Co., died November 30 at Houston. Prior to becoming a partner in the Loffland concern in 1925, Simpson had been an independent producer.

REFINING POINTERS

How 10 Control Problems Were Solved at Cities Service Plant

The systems here were described by the authors at the recent Houston instrumentation meeting of Texas A. & M.-I.S.A.

Priming Facilities for Unloading Crude Oil From Barges

by E. D. Mattix

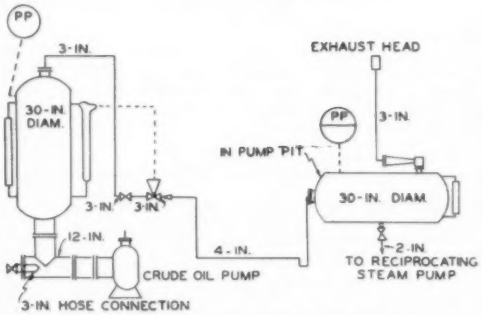


Diagram of priming system for unloading crude from barges.

VARIOUS problems are encountered in unloading crude from barges, the major one of which normally is obtaining and retaining suction on the pump used for this purpose. If a low-vapor-pressure crude is being unloaded, the major problem is encountered when stripping the last crude from the barge as air is pulled into the suction during this period. When a high-vapor crude is to be unloaded, continuous vaporization occurs in the pump suction line which materially increases the unloading time and costs.

A recent problem involved unloading 13-lb.-vapor-pressure crude oil from barges. It was found practically impossible to pump this high-vapor-pressure material from the barge because the pump elevation was several feet higher than that of the barge and vaporization occurred in the pump suction. Both centrifugal and reciprocating pumps were available for unloading.

To overcome this problem the suction lines to the pump were streamlined to reduce the pressure drop to a minimum. A vapor separator was installed in the suction of the pump to separate liquid from vapor. The vapors were piped to a steam ejector, and a liquid-level controller with a single-seated control valve was installed in the vapor line ahead of the ejector. This system has performed satisfactorily by reducing the unloading time to one-third of the original and is very desirable on unloading heavy crudes as it reduces the stripping time for the barge. The only objectionable feature of this system is a slight oil-mist carryover from the ejector.

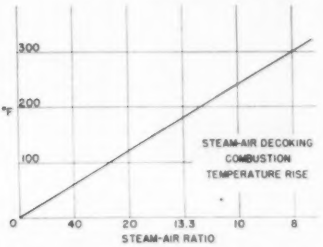
Due to the success of this system we are planning to remove the reciprocating pumps originally installed for crude unloading and install priming facilities for the other two centrifugal pumps.

Steam-Air Decoking Of Furnaces

by E. D. Mattix

MANY papers have been written on steam-air decoking of furnaces; however, all the papers read by the author indicate that this practice is an art rather than a science. After much debate, delay, and argument, it was decided to put in a test installation. Calculations based on this test indicated that the practice was a science instead of an art.

The calculations indicated that the steam-air ratio should be 10 : 1 on a weight basis to limit temperature rise on combustion to 240° F. as the temperature rise is a direct function of the per cent of oxygen present to the per cent of inert material present in the steam-air mixture. With pure



Graph showing steam-air decoking combustion temperature rise in relation to steam-air ratio.

oxygen the temperature rise is approximately 4,000° F. With steam a 0° F., temperature rise would be expected.

Meters were installed on both the air and steam with the steam meter factor 10 times that of the air meter factor. During the burning period the air-meter reading was kept at or below that of the steam reading. During the decoking period it was found that a small temperature rise occurred in all the tubes in the furnace rather than a ring of fire passing successively through each tube.

A crude-oil furnace was used for the initial decoking experiment and at present plans are being made to increase the number of installations on other furnaces.

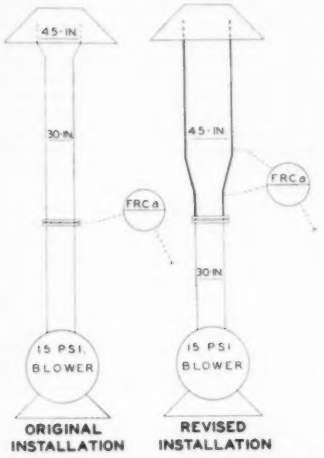
Compressor Suction Pressure-Loss Reduction

by Richard See

CALCULATIONS indicated that considerable air compressor capacity was being lost due to the orifice plate located in the suction line, as indicated in Fig. 1.

Each suction line was 30 in. in diameter and 30 ft. long. A short section of the intake line supported the hood over the entrance and was 45 in. in diameter. Air flow to the compressor was measured by an orifice in the suction line about 8 ft. above the compressor inlet nozzle. An orifice with a 0.75 d/D ratio, flange taps and a meter range of 20 in. of water was used. This represented a sizable pressure loss in air supplied to the compressor.

To reduce pressure loss in the suction line to the compressor, the orifice was removed and the length



Figs. 1 and 2—Diagram showing how orifice-plate installation was changed to reduce compressor-capacity loss in suction line.

of 45-in. pipe was increased, replacing the 30-in. pipe from the intake to the orifice flanges as illustrated in Fig. 2. The transition piece from the 45 in. to 30 in. section of the line was rolled at an angle of 15° with the vertical to form the entrance cone of a venturi. The remaining part of the line remained 30 in. in diameter, forming a "partial" venturi since there was no recovery cone. However, the lack of the recovery cone did not result in additional pressure loss since the venturi pressure drop appeared as an entrance loss in the original installation.

Pressure taps were installed above the entrance cone and in the throat below the entrance core for measuring air intake, using a flow recorder with a range of 10 in. of water. The meter factor was calculated by using standard venturi flow calculations. A correction factor was determined after startup from a test of all meters in the compressor discharge system.

As a result of the revisions to the compressor suction lines, the capacity of the compressors was increased by approximately 1½ per cent with a decrease of approximately 1 per cent in horsepower.

Expressed in terms of the original investment, the value of the change to the catalytic cracking units was approximately $110,000. The cost of the revisions was less than $1,000 for the two compressors.

Surging of Sidestream Level Controllers

by Jack Trimble and E. D. Mattix

A CONDITION existed in our sidestream strippers at the crude-oil topping units and fluid catalyst cracking units which demanded attention.

The level measuring devices were, in all cases, displacement-type Level-trols. At the crude topping units the level instruments were controlling the valves directly with the controlled air showing percentage of valve opening on indicating gages in the control rooms. In some cases at the fluid catalyst units the level instrument transmitted to instrument-type recording controllers.

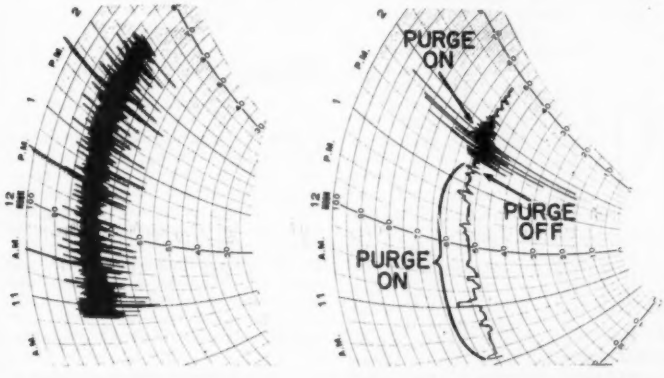
The condition under discussion was an erratic cycling of the level instruments and control valves. The pulsations varied in time from several per minute to 1 in 3 minutes, in intensity from 1 to 5 lb. change in the controlled air pressure. This condition was determined by connecting a portable pressure recorder into the output air lines between the level controllers and the valves.

An experiment was conducted to see if this condition could be corrected. A nautral-gas purge line was connected to the top of the float cage and gas was pressured through a restriction orifice into the vapor space of the float cage. After a lapse of 15 or 20 minutes, the surging stopped. (See illustration.)

It was determined that steam was condensing in the top of the float cage, forming drops of liquid and falling to the lower portion of the float cage where they hit the hot oil. They would flash vaporize, causing a reaction similar to a miniature explosion, raising the pressure in the upper section of the float cage thus causing the oil to flow back into the stripper through the lower float connection. The instrument was then giving the true level within the float cage, but this level did not correspond with the level in the stripper.

Introducing the gas purge prevented the steam and light oil vapors from entering the float cage and thereby eliminated the trouble.

Two other methods of combating this problem have been successfully used; namely, steam jacketing of float cage, and hot-oil purge of float cage.



Sections of recording chart on liquid-level controller, showing results obtained by purging the float cage.

Removable Thermo-Welds And Protective Guards

by C. A. Brodine and E. D. Mattix

FEED lines to the reactor of a fluid catalytic cracking unit contain oil vapors, steam, and catalyst at a velocity of approximately 60 ft. per second. As the catalyst particle size ranges between 0 to 80μ, these conditions presented a serious problem in maintaining thermocouple wells in the lines. A bare thermocouple well without a guard will last only 3 to 4 weeks. These thermocouples are the primary elements of the two temperature controllers by which the cracking reaction is controlled (around 900° F.). They position 30-in. slide control valves by controlling the flow of 1,100° F. regenerated catalyst from the regenerator to the feed lines and thus to the reactor.

In crude-oil refining, the operating units, until recent years, were offstream quite frequently for cleanout, so the replacing of thermocouple wells and guards was just a matter of routine maintenance. Nowadays the cat crackers are setting records one right after another for length of

runs; consequently, some means had to be found to keep thermocouple wells in lines of severe service during long runs.

The thermocouple guards, which were 3-in. structural angles per contractor specifications, were redesigned with the idea of breaking the catalyst flow as smoothly as possible, thus cutting down on the eroding effect. The point also had to be considered that if the guard was made too big, the thermocouple would be pocketed in a dead space and thus would lose its sensitivity to temperature changes. An iron wedge guard 10½-in. high, 2¼-in. wide, and 8-in. long was installed with its knife edge facing the flow 1 in. upstream of the thermowell. This was found to outwear all designs tried. Tests on alloy coating of these wedge guards are under way at present.

Long duration, cat cracker runs made the aforementioned experiments slow, sometimes well over a year before the results of our ideas could be observed. So an additional means had to be employed to keep the thermocouples in these lines after the catalyst had eroded through both the guards and the well.

A removable thermocouple well assembly was devised, consisting of a 1½-in. collar welded to the line to which was screwed a special 1½ in. by 30-in. nipple, a 1½-in. gate valve with a steam connection in both bonnet and bottom, a special 1½-in. barrel with a 2-in. stuffing box on its outer end and a steam connection on the vessel side of the packing, a packing gland, and a special 25-in. ball-and-socket thermocouple well without taper. A ¾-in. cock was installed on the head end of the thermowell which could be closed if the well tip eroded away.

The thermocouple well projected into the line 6 to 8 in. Because the barrel assembly is larger than this, it is possible to loosen the packing and pull out the well far enough to permit closing the 1½-in. gate valve before the eroded part of the well came into contact with the packing.

Since the reactor carries only 15 psig. pressure, the packing is always in contact with the good part of the well, and snuffing steam is used at three points on the assembly, this was found to be a very safe method of changing thermocouple wells during unit operation.

Dual-Range Mercury Manometer Flow Meters

by Curly Groendycke and E. D. Mattix

THE mercury differential-type flow meter in its standard, simple form with cylindrical mercury chambers and square-root flow scale is limited in usefulness where there are wide changes in the rate of flow. The rangeability or ratio for reasonably accurate flow readings is about 3 to 1.

There are innumerable flow-measurement and control applications where the maximum rates may be six or more times as great as the minimum flows. A few examples are:

1. Seasonal changes in heating-steam load.
2. Variations in feed and product rates on a refining process due to fluctuations in supply, demand, and compositions.
3. Variations in solvent feed ratio requirements with changes in type of charging stock.

Numerous flow-meter designs and arrangements are available for improvement on the rangeability of the conventional square-root flow scale. Dual range meters of a somewhat novel design have been used successfully on several applications in the refinery. While no claim is made that it is a cure-all design, it does have certain talking points and may be found quite useful in other plants.

The accompanying drawing indicates the arrangement of the mercury chambers, U-tubes, and valve manifolds, and shows the mercury levels under various conditions.

The standard float chamber, shown at the left, is on the high-pressure or upstream side of the orifice in this illustration. The auxiliary-range tube is in the center, and the so-called high-range tube is at right. In operation on low-range service, valve "A" is closed and valve "B" is open to place the two range tubes in parallel, both on the low-pressure or downstream side of the orifice; the mercury levels will rise simultaneously in these two tubes as the differential pressure increases. We have here the equivalent of one large-diameter range tube.

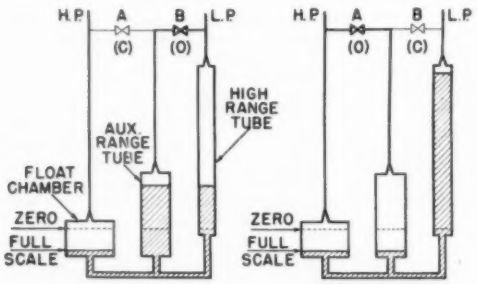


Diagram showing auxiliary range-tube hookup for low-range and high-range operation of flow meter manometer.

For high-range service valve "B" is closed and valve "A" is opened to place the auxiliary tube in parallel with the float chamber. With an increase in differential pressure the mercury levels fall simultaneously in the float and auxiliary chambers and rise only in the right hand or high-range tube. We have the equivalent of a large-diameter float chamber and a relatively small-diameter range tube.

With this design it is possible to change from low to high range or vice versa by manipulating valves "A" and "B" without "zeroing" the meter. On a sealed water, however, it is particularly desirable first to equalize and zero the meter in the conventional manner. Otherwise, some loss of sealing liquid and unbalancing of the seals would take place after repeated range changing.

Dual-range flow meters are now available from several manufacturers, usually in flow range ratios of 2 to 1. Flow range ratios of 3 to 1 would be more desirable.

For those who find a need to build their own dual-range meters, the diameters of the auxiliary and high-range chambers can be calculated easily from formulas which have been derived from simultaneous algebraic equations. The known conditions to be substituted in the formulas are the desired high and low-differential ranges expressed in inches of water-dry calibrations, and the float-chamber diameter and float travel for full-scale deflection.

Mixers

by E. D. Mattix

ONE of the problems that were encountered in our treating plant was the inflexibility of the conventional-type mixer. The mixing problem that was called to our attention was on the kerosine-treating unit where we were acid treating kerosine. It was found that the actual acid rate could be held constant and sometimes even decreased as kerosine rate was increased. We were asked to design a mixer for this service.

The final mixer used was a double-seated control valve with a poppet-type plug operated by a differential pressure controller with taps up and downstream of the control valve. It

was found necessary to reverse the control valve in the line to form a mixing chamber for best mixing. This has proved satisfactory for all operating conditions and the quality of our kerosine has been decidedly better since the installation was made. It is our opinion that a single seated control valve with a poppet plug would be more desirable for the service. Consequently, we have replaced several mixers in the plant with manually operated globe valves. These have proved satisfactory and do have the necessary operating flexibility.

Reducing Noise in Cat Cracking Unit

by C. A. Brodine and E. D. Mattix

THE solution to the problem of reducing the noise level on the catalytic cracking units in our refinery tied in with a second problem, that of automatically controlling the regenerator pressure. Excessive noise from the original installation was caused by high velocities due to a 6-psi. pressure drop. This 6-psi. drop in the flue gas stacks was divided into three steps:

1. Original butterfly valve—2-psi. drop.

2. Conventional orifice plate — 1 psi. drop.

3. New Chapman slide valve—3-psi. drop.

This reduces velocity at each point with a corresponding decrease in noise level. It is now possible to hold conversation at the base of the stack.

The new slide valve was manufactured with two slides on opposite sides of its body; one slide to be operated manually and the other to be operated automatically by a pressure controller.

Instead of operating the slide valves with one of several conventional hydraulic valve positioners with a piston as the motor, a reversible rotary air motor, mounted directly to the handwheel shaft to be actuated by a conventional nul-balance control-valve positioner that operated on air pilot valve controlling the 50-psi. air supply to the air motor was tried. This system has great possibilities, one that it eliminates the fire hazard of the hydraulic fluid and the maintenance of a separate system because the air supply is already available where pneumatic control instruments are used.

Installation can be justified on the basis that the regenerator could be run on ½ psi. higher pressure if it could be automatically controlled. The ½-psi. increase in pressure calculated a 2 per cent increase in regenerator capacity due to decreased velocities at the higher pressure. Actually the installation has paid off on each of the two factors, noise level reduction and increased capacity.

pH Control of Overhead Water Drawoff From Crude-Oil Units

by E. D. Mattix

INSTRUMENTS for pH control were installed on two crude-oil units during the third quarter of 1948. Installation of these instruments has materially improved pH control on the water draw-off from these units and thereby reduced corrosion on the overhead condensers.

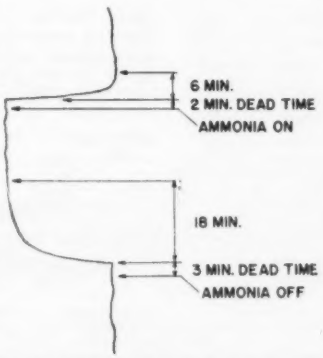
Leeds & Northrup instruments with wide throttling range and drift correction were used for the installation. The control valve, on which a valve positioner was installed, was manufactured by Hammel-Dahl.

The refinery has a central ammonia-storage drum which is piped to various units and reduced in pressure to the desired point, then vaporized before the control valve which regulates the ammonia usage to the tower. The ammonia is fed to the vapor line from the kerosine stripper. A sample of water is withdrawn continuously from the gasoline-water separator through a separate line direct to the pH cell. A separate line was found necessary because the liquid-level-control variations caused slight changes in the pH reading when the sample was taken off the regular water drawoff line.

No difficulty has been experienced with the control of the pH; however, recording of this value presented some difficulty in the beginning. Investigation showed that where one man did all the maintenance work on the installation, much better results were obtained, probably because he became more familiar with the equipment. A dry air bleed was installed in the cover of the pH cell to prevent moisture condensation. It was found that the pH reading was greatly affected by any tower pressure variation due to the change in solubility of H_2S at different pressures.

The accompanying diagram shows results of a test made on the installation to determine the dead time and capacity time of the system. All ammonia was shut off and after 3 minutes dead time the pH started to drop followed by a period of 18 minutes before it reached a minimum value. After several minutes the ammonia was opened up; following this was a 2-minute dead time followed by a 6-minute capacity time before the pH reading lined out at or near its normal value of 7. The relatively large capacity time in relationship to the small dead time indicates that the process should be controllable.

The above test was also conducted manually prior to the installation to determine if the process would be controllable.



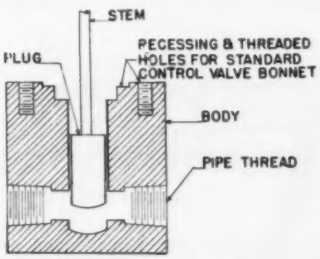
Results of test made on pH control installation to determine dead time and capacity time of system.

Controlling Flow of 50° Baume Caustic

by William Suydam

ONE section of the refinery's treating plant is a Unisol unit in which it is necessary to measure and control the flow of 50° Be. caustic. This was found rather difficult with conventional instruments due to the tendency of the caustic to crystallize and due to materials which deposited out of the caustic.

The original installation consisted of a conventional mercury manometer-type flow controller with a double-seated parabolic plug control



Piston-type "bone crusher" valve used in automatic control of caustic stream flow.

valve. The maintenance of the mercury manometer seals was excessive and the control valve had a strong tendency to slowly bridge over the ports with crystallized caustic and debris until the valve was wide open at which time a slow reduction in caustic rate occurred.

The mercury manometer was replaced by a Foxboro D/P cell. The D/P cell was mounted as close as possible to the orifice flange with no other supports than the meter piping. After steam tracing the installation we found the measurement problem was whipped.

Controlling, the second half of the problem, was solved by the designing and use of a piston-type valve. The valve as shown in the accompanying illustration consists of a commonly used control-type diaphragm and yoke and the newly designed valve body with a cylindrical plug. Tight shutoff was not essential. A somewhat balanced plug was obtained by cutting a slot on the downstream side of the plug. This equalized the pressures on the top and bottom of the plug. This valve is commonly called, by our instrument men, the "bone crusher."

Device Aids Corrosion Study

by D. H. Stormont
West Coast District Editor

A DEVICE which permits corrosion coupons to be readily introduced or removed from pipe lines, heater tubes, and well-head equipment while they are in service is expected to greatly facilitate studying corrosion resistance of various steels and metals under actual operating conditions. Conversely, it also will be beneficial in studying effectiveness of various coatings as corrosion preventives.

The corrosion-study device is an adaption of the "Scotch" nipple which about a year ago was developed as a means of gaining simplified, more economical christmas trees. In this service in well-head hookups, the nipple employs a gage-carrier plug which can be removed (or inserted) under full well pressures through use of a special high-pressure lubricator. When the plug is removed and a seat protector inserted in its place, the nipple is converted to a regular flow nipple. *(See The Oil and Gas Journal, page 81, September 28, 1950).*

In its new use the plug is made into a coupon holder, as illustrated in Fig. 1, with the coupon completely insulated from the plug. Being thus insulated the coupon is not affected by any along-the-line currents which may be present. It is removed from or placed in the pipe line as desired without interfering with the line's operation.

More than 400 of these devices are scheduled to be installed soon to study corrosion in pipe lines and refineries on the Gulf Coast and in the Mid-Continent areas. On the incoming crude line to a large refinery in the Houston area, 25 of the nipples have been installed within a distance of about that many yards. This group will be used to study the corrosion resistance of various types of steels, and the protection afforded by various plastics and other coatings.

How installed and used.—To gain access to any line the company welded 2-in. threaded welding nipples to the pipe, after which a hole was drilled through the pipe and the coupon-type Scotch nipple assembly screwed into place (see Fig. 1). This was done while the line was temporarily out of service.

As illustrated in Fig. 2, the plug is removed or inserted through use of a 22-in. stroke lubricator and a full-opening valve. Acme threads are provided on the nipple assembly so that the valve can be readily attached by means of a union wing nut. On the other outlet of the valve a similar fitting is provided for rapid connection of the lubricator to the valve.

With this equipment in place and the valve opened, a coupon-holding plug is removed from the line by the lubricator being pushed forward and operated to unseat the plug. After the plug is pulled past the center of the valve, the latter is closed and the lubricator removed. Prior to the valve being closed, line pressures pass into the lubricator where a balance is maintained between the mandrel and inner and outer cylinders.

Using the 22-in.-stroke lubricator, coupons up to a length of about 8 in. can be handled. Thus in pipe up to 8⅝ in., a full cross-section study can be made of corrosive conditions inside the line. In pipe of larger diameter, only a partial cross-section study can be made with the ⅞ by 8-in. coupons, or a lubricator with a longer stroke would be required.

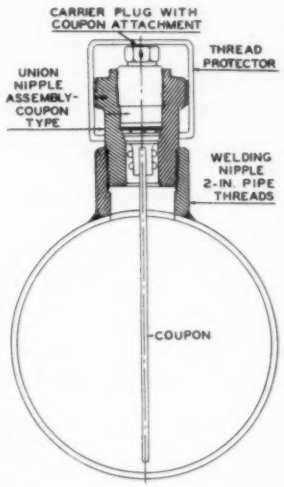


Fig. 1—Cross-section sketch of coupon-type nipple assembly installed in pipe line with thread protector in place.

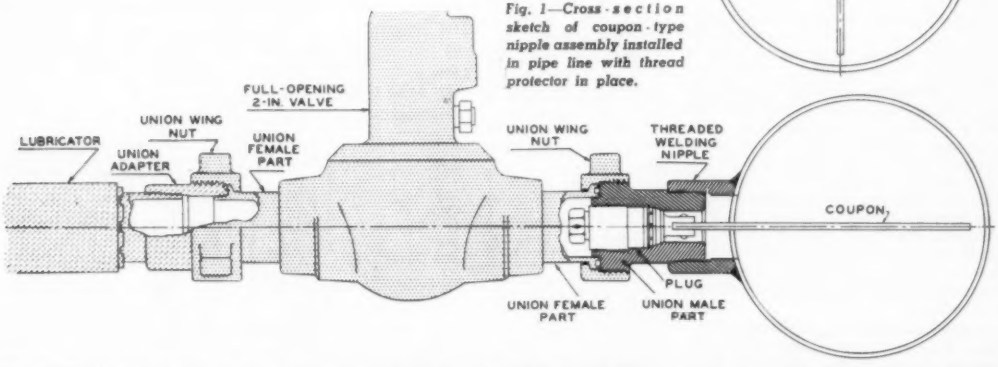
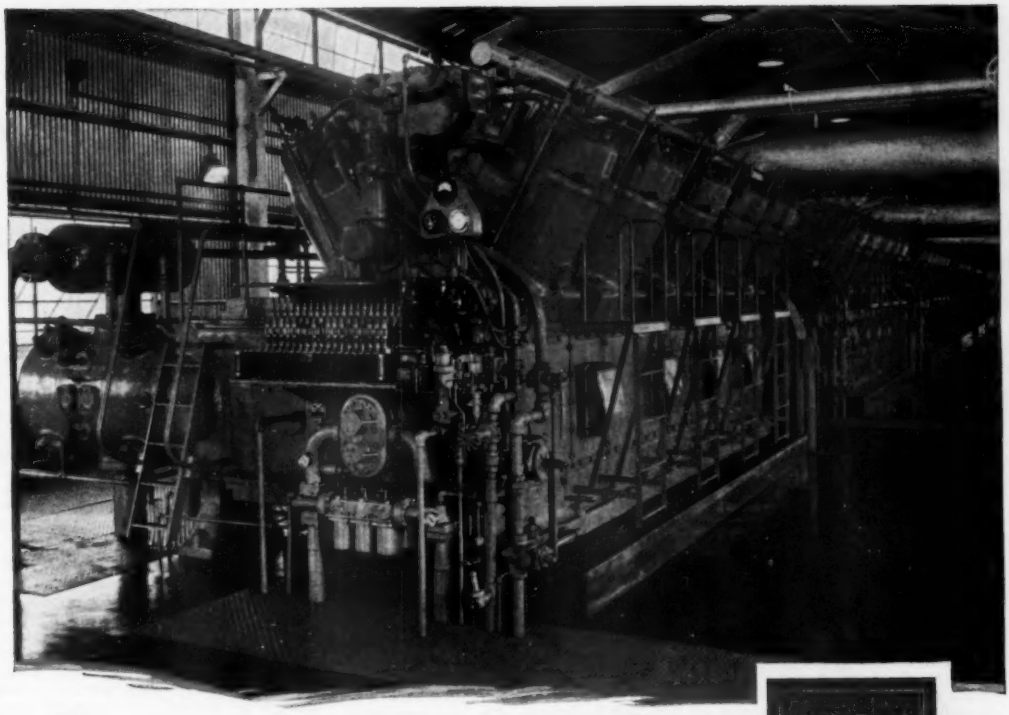


Fig. 2—Sketch of device used for inserting or removing coupon from pipe line. Device attaches to coupon holder with union wing nut. Right-hand part of this assembly is the same as that shown in Fig. 1, except thread protector has been removed.



Space savings add up big...

...in the Shell operated Elk City Plant!

Another Example of Efficient Power at Lower Cost

TAKE a look at the compact, clean-cut line of engine-driven compressors shown here — seven Cooper-Bessemer 10-cylinder GMV's. Not so long ago the rating of these units would have totaled 7,000 horsepower. But with today's *supercharged* GMV's, it adds up to 9,450 horsepower. Thus, 7 GMV's are now doing the work of 10 older-type units . . . *with no increase in speed* and in only 7-unit space. Think what this saves in installation cost, piping, housing, maintenance, supervision and other expense items!

What's more, supercharged GMV's, like these, also offer important new economies in fuel and lube oil consumption. Straight through it's a more *efficient* operation.

Here you have the reasons why Shell and so many other companies are taking advantage of the latest developments in Cooper-Bessemer V-Angle design. The emphasis is on *big savings*, combined with the smooth dependability long demonstrated by these modern V-Angle units.

The
Cooper-Bessemer
Corporation

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

New York, N. Y. Washington, D. C. Bradford, Penna. Parkersburg, W. Va.
San Francisco, Calif. Houston, Dallas, Greggton, Pampa and
Odessa, Texas Seattle, Wash. Tulsa, Okla. Shreveport, La.
St. Louis, Mo. Los Angeles, Calif. Chicago, Illinois Caracas, Venezuela

That Spectacular Spraberry

A SYMPOSIUM ON WORLD'S LARGEST OIL FIELD—PART 3

Acid Flushing Fractures in Spraberry Sand

by Brance Bristol, Jr. and Cy Helm
The Western Co., Midland, Tex.

Two years ago one of the first wells in the Spraberry trend was treated with mud acid. This treatment was labeled an acidizing failure, in that it didn't increase the production noticeably. In recent months, however, it has been considered successful in that it had, to some extent, cleansed the fractures of mud and foreign material. Acid, incidentally, was the only completion method employed on this well, and its production decline has been very flat. To date, there have been roughly 100 wells which have been "Fracture-flushed," and the results have been good.

THE primary obstacles to conventional acidizing in the Spraberry sand are, the facts that the solubility of the formation is very low, the permeability is very low, and the secondary permeability (fractures) is not naturally plugged with an acid-soluble deposition.

Since the principal function of acidizing is to increase the permeability of the formation, it was evident that conventional acidizing practices were not only inapplicable, but very nearly impossible, technically. A study of the drilling and completion practices throughout the trend brought out several facts which led to the development of "Fracture-flush" acid.

Structure of the Spraberry sand, and the shale above the sand proper, make it a natural trap for drilling mud, lost-circulation material, and cement that come in contact with it.

The accompanying photographs of cores are from a well that set casing 67 ft. above the top of the Spraberry sand, before making deeper penetration, and had no noticeable lost circulation during the time that pipe was being run.

This particular well was a "textbook" pipe job. Returns were observed all the way during cementing operations. No cement was found in the core fractures. A temperature survey which shows nice fillup is therefore not indicative that some mud and cement were not lost, even though good returns throughout were observed during the running and cementing operations.

Fracture-flush acid has been developed to break up concentrations of these foreign materials and to flush them from the fractures into the well bore where they can be removed by conventional cleanup methods.

If the fractures in a Spraberry well are contaminated with one or all of these materials, it is good practice to fracture-flush before pressure parting, and get the fractures as clean as possible. Two out of three wells so acid treated as initial completion methods have shown some increase in production, but don't look for big production increases if the treatment is used at this stage of the completion. The steep production-decline-curve wells are the ones that show the largest production increases after the treatment.

Fig. 1 shows extraneous contaminating material removed from a Spraberry well. This is typical of wells which hold contamination in the fractures. At this point, the well was pressure parted, but there wasn't a teacup of increase in production. However, when the well was Fracture-flushed, it unloaded so much mud, gel, etc., that it plugged the tubing. Continuous running of the sinker bar loosened and the plugging material and the well finally cleaned itself. A test 1 week later showed an 800 per cent increase from a $1,000 investment. And after 90 days, this well is still making its allowable.

Fig. 1—Drilling-mud material and reverse-circulation cutting from a Spraberry producer. This well had been pressure parted, later acid treated by the method described in article. The well then unloaded forcibly and the material plugged the tubing. The plugging material finally was flowed out after running sinker bar, and was caught for inspection.

A nationwide

SERVICE ORGANIZATION

...with fully equipped field service shops, strategically located factory-trained service engineers, supported by a staff of trained distributor personnel.

oilmaster

PUMPS

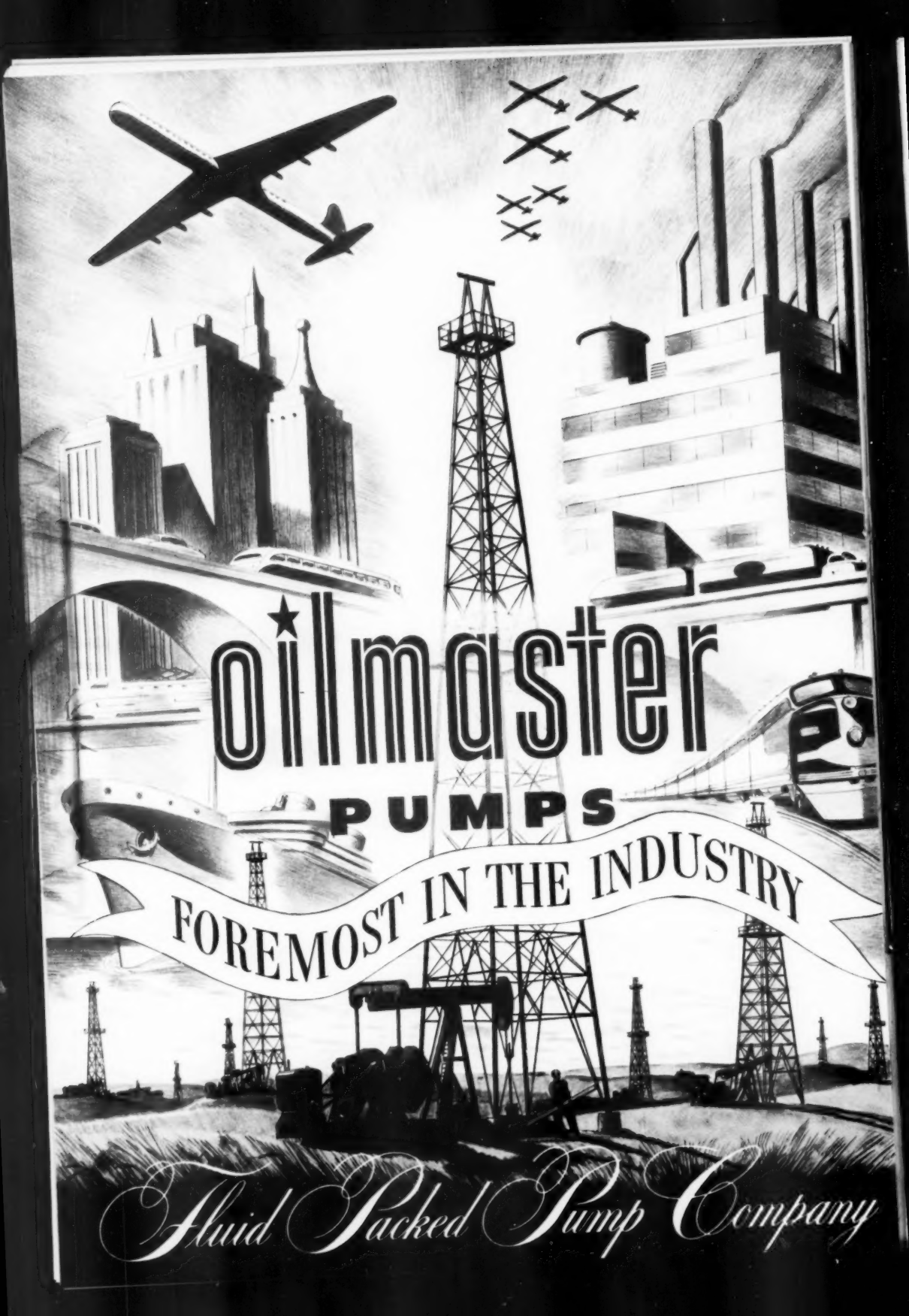
FOREMOST IN THE INDUSTRY

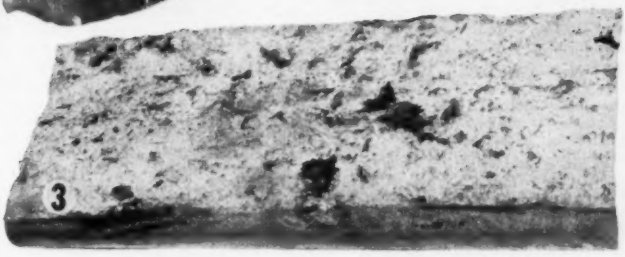
Main Office and Plant, Los Nietos, Calif.

Distributed by The National Supply Co. **Export: National Supply Export Corp., 600 Fifth Avenue, New York**

Co-Distributors: Berry Supply Store, Beacon Supply Co., Industrial Supply Co.

Fluid Packed Pump Company


oilmaster
PUMPS
FOREMOST IN THE INDUSTRY
Fluid Packed Pump Company



1.—Spraberry core taken 6,954-84 ft. On the face of the vertical fracture (only one-half of the circular core is shown) appear particles of rotary mud, fibrous material, and cottonseed.

2.—Core from another Spraberry well. Here the top of the Spraberry was found at 6,988 ft. Again a vertical fracture split the core; it shows the same condition as in preceding photo.

3.—Sample of Spraberry core taken within 7,060-98-ft. interval. This specimen, from near base of bottom core shows mud, fiber, and cottonseed hulls in the vertical fracture which split the core.

4.—Sample taken between 7,022-64 ft., split by vertical fracture. Rotary mud was found in the horizontal fractures also present in these cores.

The plugging material removed was mainly mud, reverse-circulation cuttings, and fibrous lost-circulation material. In the lower part of Fig. 1 may be seen grains of Ottawa sand (excess propping agent). This material plugged the tubing perforations and necessitated a trip. The well had been producing only about 40 bbl. of oil per day, after the initial test of 200 bbl. of oil per day. The operator then ran the Cavins bailer and picked up pieces of the producing formation, shown in the upper left-hand corner of Fig. 1.

Types of Treatments

Seventeen per cent of the Fracture-flush-type treatments (total 100 jobs) have been made by conventional acidizing procedures. Seventy-three per cent have been made under hook-wall packers, and nine per cent under formation packers. A point to be noted here is that two out of three of these formation packers jobs held successfully throughout the treatment. One job was made down-the-pipe. This was a second-stage treatment of 5,000 gal.; the tubing plugged on the first stage.

Pressure.—Treating pressures will run from 400 to 1,100 psi. Pressure breaks, as in conventional lime or dolomite wells, generally indicate a good job and nice production increase. Breaks have run from 75 to 400 psi.

Cleanup time.—This will average about 1 day of swabbing operations.

Return acid.—This is one variable that is strictly dependent upon the type and kind of material in the fracture. We have had "hot" acid return (very slightly spent) and observed a good production increase from the well. Conversely, acid has returned almost completely spent, and resulted in nice production increases. This indicates that acid-soluble material was present in the fractures.

We have taken samples of the swabbed returns on the hour and analyzed for ferrous and ferric iron, chlorides, pH, and surface tension. These tests have yielded information so erratic that definite conclusions are impossible at the present time. We have had cotton-seed hulls, fibertex, expanded perlite, and muds suspended in the returned acid.

Production increases.—Fifty-one per cent of the wells Fracture-flushed more than doubled in production, some over 800 per cent. Cost of the acid treatment for 73 per cent of the wells paid out within 3 weeks; a few wells have shown production decreases, due to plugged tubing and caving of the formation.

Reservoir Performance

by Ray Brack
Ohio Oil Co., Midland, Tex.

TESTS on various samples of oil produced in the Spraberry area in Texas show similar physical properties. However, the data which have been released do not represent a complete coverage of the entire area. But, up to now, no test has been observed which shows any major deviation from this data.

In the area, fair agreement exists

TABLE I—RESERVOIR FLUID PROPERTIES

Field—	Pembrook	Tex-Harvey	Germania	Driver	Tex-Harvey
Well name—	B-3 Ralph Pembrook	1 John Snowden*	1-18 Fasken	1 C. J. Cox	1 Boone
Reservoir temperature, °F.	133	140	141	137	138
Saturation pressure, psig.	2,090	2,320	1,920	1,939	1,834
Formation volume factor, bbl. reservoir oil per bbl. stock-tank oil	1.431	1.355	1.423	1.386	1.417
Viscosity, cp. at reservoir temperature and pressure	0.62	0.98	0.66	†2.83	‡2.34
Dissolved gas-oil ratio, std. cu. ft. per bbl. reservoir oil	791	677	725	714	753
A.P.I. gravity of stock-tank oil	36.2	37.0	37.7	37.1	37.0

*Recombined sample. †At 136° F. and 0 psig. ‡At 139° F. and 0 psig.

between the reservoir temperatures at approximately 138° F. The formation volume factor is found at 1.4 bbl. of reservoir oil per barrel of stock tank oil. The solution ratio is at 725 standard cubic feet per barrel of reservoir oil and the gravity at 36.5° A.P.I. Samples show that the gas is undersaturated—which fact is supported by the lack of any field evidence of the presence of free gas in a gas cap.

Viscosity of the oil in the reservoir at reservoir temperature and pressure varies from 0.62 to 0.98 cp. On two of the samples the viscosity was reported at 2.34 and 2.83 cp., at reservoir temperatures, but at atmospheric pressure.

Static pressure in the reservoir on the Snowden well (Tex-Harvey) was 1,976 psi., while the average reservoir pressure at the time the sample was taken was 2,020 psi. The original reservoir pressure was estimated to be 2,300 psi. On the sample taken in Germania field the static pressure was 1,930 psi. For Driver field the shutin pressure at 6,500 ft. (or —4,196) was 2,262 psi. On the Tex-Harvey sample the pressure was 2,240 psi. at 7,000 ft.

For the purpose of broad discussion of the entire trend, the oil in the reservoir can be assumed as being an undersaturated crude with a dissolved gas-oil ratio of 725 cu. ft. per barrel and having a formation-volume factor of approximately 1.4.

Reservoir Performance

Seaboard Oil Co. completed the 2 S. E. Lee on January 22, 1949, in Spraberry Deep field, Dawson County. The discovery well in Tex-Harvey field was Tex-Harvey Oil Co. 1-16 Mrs. B. W. Floyd. It was completed March 15, 1949, as a pumper and made 135 bbl. of oil per day plus 13 per cent water. These two wells are the discovery wells for the productive formation and for the big development which followed in the Midland area. Reservoir performance for 16 oil fields have been examined. The latest one in this report is Flat Rock field in Upton County, which was completed on July 21, 1951.

Tex-Harvey field.—On September 1, 1951, there were 250 producing wells in this field. As of that date these wells had an accumulated oil production of 2,988,476 bbl. This gives an accumulative production just under 12,000 bbl. per well. During August the field produced 571,805 bbl. which was an average of 2,287 bbl. per well per month. During August the field produced 86 per cent of its allowable which compares with 88 per cent of the accumulative allowable for the entire life of the field. A recent tabulation reports 60 locations in the field with 65 rigs running currently. This is one of the few fields with a two-point pressure history. The original pressure is estimated to be 2,325 psi. The average pressure for June was 1,958 psi. with a drop of 367 psi. which is 8,143 bbl. of stock-tank oil per pound reservoir drop.

The first annual gas-oil ratio survey was turned in to the Texas Railroad Commission on October 15, 1951. Gas-oil ratios were reported on 213 wells and of these the arithmetic average was 1,222 cu. ft. per barrel. The weighted average on the basis of volume of fluids produced during the tests gave a gas-oil ratio of 1,237. Only eight wells reported gas-oil ratios of 2,000 or above with the highest one being 2,606. Initial gas-oil ratios for some of the older wells was approximately 554 cu. ft. per barrel.

Weddell field.—Four wells were producing in this field in Reagan County during the month of August 1951. Cumulative production was 6,186 bbl. at the end of August. The 1 Blackwood & Nichols Weddell was the discovery well and was completed on May 23, 1951. It flowed 209 bbl. per day and had a 764 ratio. The original pressure at —4,490 was 2,535 psi.

Weiner-Floyd field.—Here in Upton County 15 wells have produced 56,009 bbl. or an average of 3,737 bbl. per well. The entire field has produced 57 per cent of the accumulative allowable but during August produced 71 per cent of the August allowable. The discovery well was drilled by Ted Weiner and was the 1-17 F. A. Braden, completed on February 13, 1951. The initial potential was 452 bbl. per day with a gas-oil ratio of 535.

Aldwell field.—Located in Reagan County, this field was discovered by Paul F. Barnhart when that company completed 1-15 G. F. Wimberly on June 21, 1951. There were three wells producing in the field as of August 1951, and they had accumulated 21,220 bbl. of 7,073 bbl. per well. The discovery well had an initial gas-oil ratio of 880 cu. ft. per barrel and flowed 176 bbl. on the test.

Benedum field.—At the end of August 1951 this field had 21 producing wells, and had accumulated 74,980 bbl., with a per well average of 3,570 bbl. During August it produced 79 per cent of its allowable and at the end of that month had an accumulated production of 78 per cent of the accumulated allowable.

Driver field.—Located in Midland and Glasscock counties, this field had 48 producing wells at the end of August. The accumulative oil was 194,867 bbl. for an average of 4,060 bbl. per well. During August it made 82 per cent of its allowable and overall has produced 80 per cent of its allowable. The discovery was the Ted Weiner et al., 1-16 J. W. Driver which was completed on January 26, 1951, and flowed 304 bbl. of oil per day, with a gas-oil ratio of 615 cu. ft. per barrel.

Flat Rock.—Here in Upton County, the field had two wells at the end of August. It had accumulated 3,638 bbl. The discovery well was completed on July 21, 1951, and flowed 103 bbl. with a gas-oil ratio of 1,157 cu. ft. per barrel. This is the newest of the separate fields.

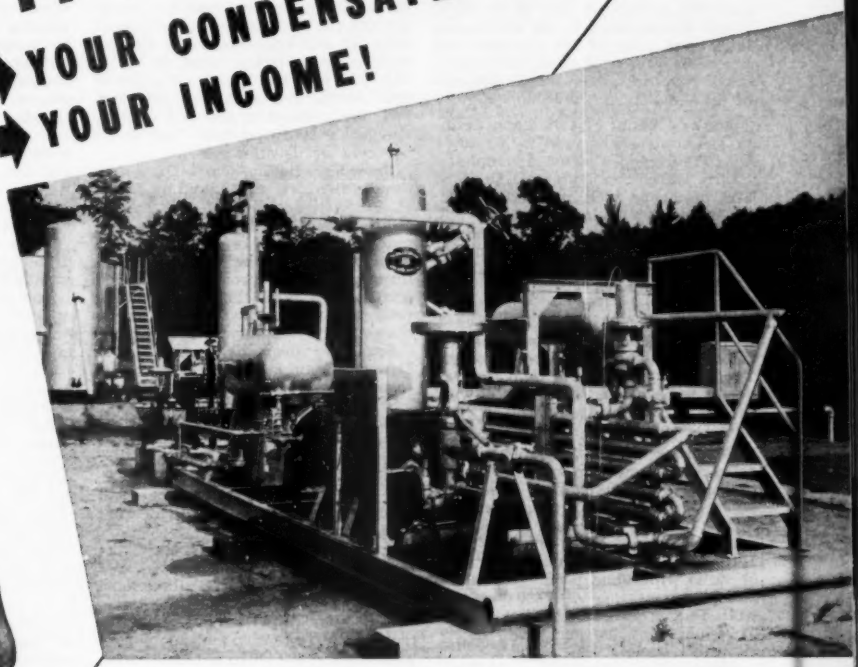
Germania field.—This field in the north of Midland County was discovered by Cumberland & Weiner with the 1 Andrew Fasken. The discovery well was completed on January 3, 1950. It flowed 100 bbl. of oil per day with a gas-oil ratio of 675. At the end of August, 39 producing wells had accumulated 426,310 bbl. for an average of 10,931 bbl. per well. During August the field produced 86,690 bbl. which was 82 per cent of its allowable and has produced 86 per cent of its accumulated allowable. The gas-oil ratio for 40 wells reported on October 15 showed an arithmetic average gas-oil ratio of 1,241 and a weighted ratio of 1,256. Two wells produced with an excess of 2,000 cu. ft. per barrel. The highest of these had a ratio of 2,488. The discovery well was drilled in January 1950. The development started 6 months later.

Glass field.—Located in Martin County, this field was discovered by Gulf on January 13, 1951, when it completed the 1-B G. W. Glass. Initial production was 100 bbl. of oil per day with a gas-oil ratio of 990 cu. ft. per barrel. During the month of August this single well produced 1,252 bbl. or one-half of its allowable. It has accumulated 10,039 bbl. which is 59 per cent of its accumulated allowable.

INCREASE...

YOUR CONDENSATE RECOVERY!

YOUR INCOME!



with PARKERSBURG HYRECO

● You can add hundreds of dollars per month to your revenue from gas wells by increasing condensate recovery with the PARKERSBURG HYRECO WELLHEAD PROCESSING UNIT. That's the record made by operators who have Hyreco units on their high pressure gas wells.

Only the Parkersburg Hyreco gives you this kind of performance, consistently. It is the only method of cold separation that successfully removes water from the gas stream at wellhead pressure, thus eliminating the necessity of introducing large volumes of water into the cold separators. Hyreco frequently increases condensate recovery by more than 5 to 15 barrels per million feet sold . . . eliminates costly downtime due to freezing . . . normally eliminates the need for dehydration units to prepare gas for pipe line delivery.

To suit your particular needs or desires, Parkersburg Hyreco offers you the option of 3 basic cold separation process assembly arrangements.

Ask your Parkersburg Representative to show you comparative records that prove Hyreco increases condensate recovery . . . increases your earnings.

PARKERSBURG RIG AND REEL CO.
Parkersburg, West Va.

No. 5118

PARKERSBURG

PRESSURE EQUIPMENT

HORIZONTAL AND VERTICAL SEPARATORS • HYRECO • HYDRACEPTER • SCRUBBERS • TREATERS • HEATERS

Manufactured in Houston Texas

Huddle - Manning. — This field in Dawson County was discovered by Fred Manning with the completion of 1 D. Huddle October 10, 1950. The discovery well made 186 bbl. of oil per day, with a gas-oil ratio of 625 cu. ft. per barrel. At the end of 1 year this is the only well in the field. It has accumulated 21,440 bbl. which is 53 per cent of the accumulated allowable. During August 1951 it produced 2,303 bbl. which was 74 per cent of the August allowable.

Midkiff field.—This Midland County field was discovered by Humble Oil & Refining Co. when it completed 1 Lilly Midkiff on September 20, 1950. The discovery well pumped 80 bbl. per day with a gas-oil ratio of 749 bbl. on the initial test. At the end of August there were 14 wells in the field and these wells had accumulated 66,045 bbl. for an average of 4,718 bbl. per well. During August the field made 24,535 bbl. or 90 per cent of its allowable. The October gas-oil ratios were submitted for 15 wells. The highest ratio in the field was reported to be 966 cu. ft. per barrel with the weighted average 763 cu. ft. per barrel.

Pembrook field. — This field is located in Upton County. Discovered by Humble with its 1 Ralph Pembrook on January 8, 1950. This well pumped 34 bbl. of oil per day and 10 per cent water. The initial gas-oil ratio was 517. At the end of August there were 34 wells which had produced 323,175 bbl. for an average of 9,595 bbl. per well. During August the field made 67,149 bbl. of 78 per cent of its allowable.

North Pembrook.—Also located in Upton County, this field was discovered by Paul F. Barnhart with the A-1 V. P. Tippett on May 14, 1951. It flowed 343 bbl. of oil with a ratio of 631 on the test. At the end of August, 17 wells had accumulated 64,870 bbl., for a per well average of 3,228 bbl. During August the field produced 29,298 bbl. or 81 per cent of its allowable.

Smith field. — The only well in this field, Dawson County, is the 1 M. V. A. Smith completed by Standard Oil Co. of Texas on November 27 1950. It was completed as a flowing well with an initial potential of 84 bbl. per day and a gas-oil ratio of 423. At the end of August this well has accumulated 21,005 bbl. During August it produced 2,408 bbl. or 72 per cent of its allowable.

Snowden field. — This Dawson County field was discovered by James H. Snowden with the 1-30 Carrie S. Dean in May 1951. The discovery well pumped 160 bbl. of oil per day with a ratio of 324. At the end of August three wells were producing and had accumulated 17,318 bbl. The October ratio report for two of the wells showed an average ratio of 461.

Spraberry deep field.—Located in Dawson County, this field was discovered by Seaboard Oil Co. with the 2 S. E. Lee on January 22, 1949. The discovery well flowed 319 bbl. with a gas-oil ratio of 750. At the end of August, 36 wells had produced 1,252,858 bbl. or an average of 34,829 bbl. per well. During August the field produced 91,179 bbl. or 99 per cent of its allowable.

For the month of August the Spraberry Deep averaged 2,533 bbl. per well while Aldwell field averaged 761 bbl. per well per month. Some of the other important averages are the Tex-Harvey on which the average well made 2,289 bbl., Benedum with 1,626 bbl., Driver with 1,984, Germania with 2,223, Midkiff with 1,753, and Pembrook with 1,975 bbl. At the end of August the accumulated oil for the entire series of fields was 5,525,448 bbl.

History and Development of The Spraberry Trend

by W. M. Osborn
El Capitan Oil Co., Midland, Tex.

AFTER years of sporadic activity during which time more or less intensive development has taken place on the Central basin platform and on the Eastern platform, the Midland basin has produced what is probably the most controversial oil field ever discovered—the Spraberry trend. It certainly appears to be the largest.

Arguments are ranging on all sides over economics, geology, and completion methods. It appears that those taking issue on the question of economics can be divided into two camps. For the most part, the group who argue enthusiastically that drilling for Spraberry production is profitable, is composed of operators who have leases in the trend, and the group who argue just as enthusiastically to the contrary is composed of those who do not own Spraberry acreage. Whether this support is due to the fact that the operators have better information or stems only from wishful thinking is what we are hoping to answer at this Spraberry symposium.

However, I do not see how so many could spend so much money on wishful thinking when we all like to think of ourselves as being tough-minded businessmen and are backed in many cases by tough-minded bankers. Where there is so much smoke, there must be some fire. Of course, there can be found some Spraberry operators who are cool on the economics, just as you can find some non-Spraberry operators who are hot. This is only natural since in any oil field there will be good wells and there will be some which will never pay out.

After a rather slow start, the tempo of development in the Spraberry sand gradually increased until it reached boom proportions during the spring of 1951, and now is scattered over an area approximately 150 miles long and 50 miles wide.

By the first of October there were a total of 596 wells producing from this sand and 225 wells were drilling. Total cumulative production from these wells as of October 1 was 6,801,171 bbl., and so rapid has development been of late that 1,257,929 bbl. were produced during the month of September. Eighteen per cent of the total production was produced during this past month. It is estimated on the basis of present costs that something in the neighborhood of $60,000,000 has been spent on drilling these wells, and $17,000,000 worth of oil has been produced, and that $3,145,000 gross was returned during September.

Spraberry name. — The Spraberry sand received its name from the fact that it was first recognized in the Seaboard Oil Co. 1 A. J. Spraberry, a wildcat drilled in what is now known as Spraberry Deep pool of east-central Dawson County in 1943; however, the first commercial producer from this sand was the Seaboard 2-D Lee in the same pool. The Lee well, after being drilled to the Ellenburger, was plugged back and completed January 1949 in the upper Spraberry for an initial production of 319 bbl. per day flowing.

Tex-Harvey.—In February 1949 the Tex-Harvey 1 Floyd was completed in east-central Midland County. This discovery opened the second Spraberry pool in West Texas, and it, too, was completed after plugging back from the Ellenburger. At the end of 1949, there were no more than three wells producing in this pool, and at that time no particular importance was attached to either of these two discoveries.

Early in 1950 two widely separated Spraberry discoveries were completed. The Hunt 1 Clayton and Johnson was completed for a small producer

in the one-well Gail pool of Borden County, and the Humble Oil & Refining Co. 1 Pembrook in Upton County was completed for a small well after plugging back to 7,169 ft. from a total depth of 12,600 ft.

Germania.—Germania pool was opened in March 1950 with the completion of the Snowden 1 Faskin. Immediately after the completion of the Snowden well, Republic Natural Gas Co. proved the multipay Benedum field to be productive in the Spraberry by the completion of its 1 Barnett.

Midkiff.—The Midkiff area of southwestern Midland County, the Manning-Huddle area of central Dawson County, and the Smith area of extreme north-central Dawson County were discovered during November and December of 1950. So rapidly were wildcats completed for discoveries and extensions after January 1951 that by late summer both the Texas Railroad Commission and the Petroleum Administration for Defense fully recognize only those wells drilled 3 miles or more from production as being wildcats.

Stratigraphy and Structure of The Spraberry Trend

by J. H. Bartley
Consulting geologist, Midland, Tex.

DUE to common usage among West Texas geologists the term Spraberry has now been accepted to designate that particular group of lower Permian sandstones of lower Leonard age which occupy the Midland basin and certain portions of the eastern shelf or eastern platform area of West Texas.

Recent investigation of the Spraberry sandstone section of the Permian indicates it to be a siltstone rather than a sandstone. However, common usage will undoubtedly term it as a sandstone. For purposes of this discussion it will be referred to sandstone.

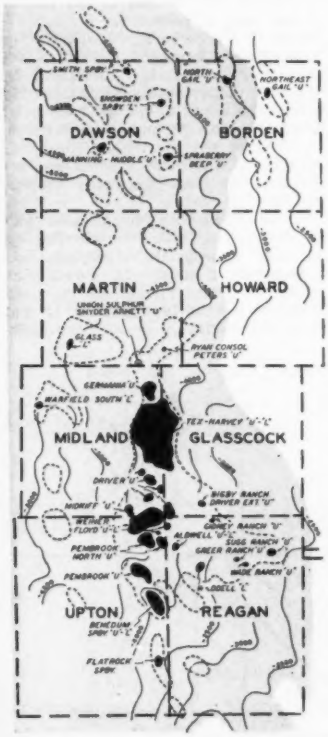


Fig. 1—Regional structure map on top of Spraberry sandstone with 500-ft. contour intervals.

Spraberry, Type Locality

At the type locality in Spraberry Deep field, Dawson County, the Spraberry sandstone consists of an upper sand member approximately 300 ft. thick with a lower sand member of about the same thickness. The two zones are separated by approximately 250 ft. of shaly gray-to-brown limestone somewhat silty and sandy in nature, with streaks of brown calcareous shale. However, to the south of Spraberry Deep field, in the better-developed portion of the Spraberry trend in Midland, Glasscock, Upton, and Reagan counties, the sandstone members comprising the upper Spraberry usually average 250 ft. thick. The lower sandstone members are approximately 500 ft. thick. The intervening section of shaly gray-to-brown limestone, predominantly shale in nature, averages 310 ft. in thickness. Generally speaking the Spraberry sandstone section will average 1,000 ft. in thickness in the south portion of the developed area.

Structure Trend

The major portion of Spraberry production occurs in broad regional west-plunging monoclinal noses with minimum closure which is also the common type structure. However, Pennsylvanian reef buildups in the

(Continued on page 112)

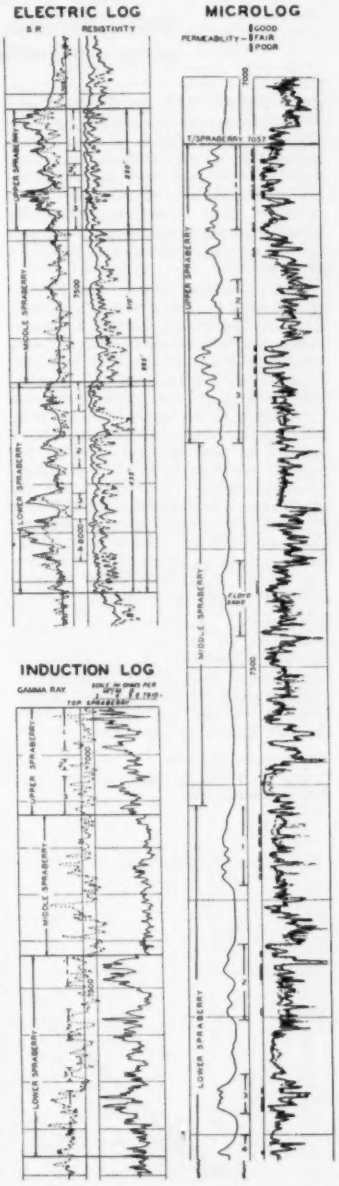


Fig. 2—Typical electric log, induction log, gamma-ray curve, and MicroLog, indicative of Spraberry section found throughout most of the trend area.

Principles of MicroLog Interpretation

by Hubert Guyod*

Want formation-pay thicknesses accurately, in detail? This article discusses both elementary theory of these new-type logs, gives a scientific method for interpretation.

CONVENTIONAL resistivity graphs give average data for a horizontal slice of formation which is generally from 1 to 3 ft. thick; therefore, they do not show well layers which are less than 3 or 4 in. thick. Inasmuch as most formations, especially limestones, are nonuniform, these logs do not reflect in detail the geometry of strata.

Great vertical detail can be obtained only by using very short electrode arrangements, but the measurements made with such arrangements would be much affected by the mud conductivity if special precautions were not taken: the electrodes must be assembled on an insulating body held against the bore wall and large enough so that the influence of the mud is minimized. The best arrangement available at present uses, as electrodes, small disks mounted in a rubber pad which is held against the bore wall by means of springs.[1] The diameter of these disks is a fraction of an inch, and their distance is of the order of 1 in.

Resistivity measurements made with such an arrangement gives the average resistivity of a volume of formation of only a few cubic inches. These measurements are called MicroLog,† or contact log, and they have the two following features:

1. The graphs have a tremendous vertical detail.

2. The measurements involve primarily the mud cake, if any, and the thin shell of formation, a few inches thick, placed immediately behind the bore wall.

3. The effect of the mud is so minimized that the log gives good data in very salty mud, while conventional electric logs are of little value.

The method is further improved by making two, or more, resistivity measurements with different electrode separations, as is done in conventional resistivity logging. By comparing the resistivity data given by the various arrangements it is frequently possible to ascertain whether certain beds are permeable, as will be explained later.

Elementary Theory

The interpretation of a MicroLog is simple if the principles involved are understood. The response of such a logging arrangement on any type of formation can be investigated by applying the same method as that used in conventional resistivity logging and in surface exploration.[2]

It will be assumed that, before it is drilled, the formation under survey is uniform. After drilling, the hole diameter and the degree of invasion in permeable beds will therefore be reasonably uniform. At the time the measurements are taken the following media are found at increasing radial distances from the electrode pad (see left portion of Figs. 7 and 8).

Medium No. 1: i.e., the mud cake if the formation is permeable, or the thin mud film if the formation is impervious. The mud film is caused by the imperfect matching of the electrode pad on the bore wall. Generally this film has not a uniform thickness, but its average thickness is probably reasonably constant for a given formation.

Medium No. 2: i.e., the medium situated behind Medium 1. If the formation is impervious Medium 2 is the formation itself. If the bed is permeable Medium 2 is the mud-invaded zone.

Medium No. 3: this is the noninvaded zone of permeable formations. There is of course no Medium 3 for impervious formations. Also, it is not necessary to consider Medium 3 in the case of permeable formations for which the depth of the mud invasion is greater than perhaps 6 in. because, in view of the short electrode spacings used, this medium does not influence the measurements appreciably.

In the following, thicknesses will be denoted by T and resistivities by R, with appropriate subscripts.

Impervious beds.—In dense or other competent formations the bore diameter is fairly uniform. If the bore-wall surface is smooth the mud-

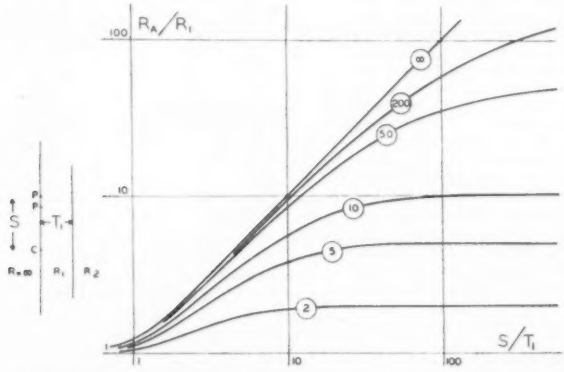


Fig. 1—ELECTRODE SPACING.—Apparent resistivity in terms of electrode spacing for two media separated by a vertical plane. Figures in circles denote resistivity contrast R_2/R_1. Data are for three-electrode arrangements.

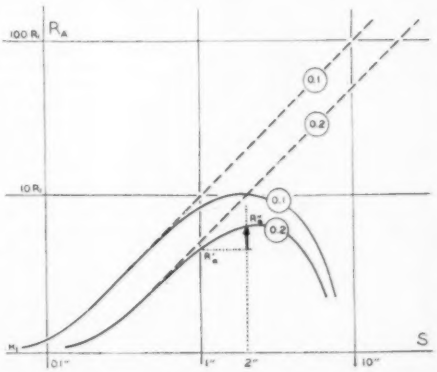


Fig. 2—MUD COLUMN.—Effect of the mud column on the apparent resistivity of a dense formation. Figures in circles denote mud-film thickness.

*Consultant, Houston.

†Reg. U. S. Patent Office. Schlumberger Well Surveying Corp.

film thickness T_1 is small if the electrode pad is properly designed: say 0.01 in. or even less. If the wall surface is a little rough, the average thickness is somewhat greater, perhaps 0.02 in.

In shales there is usually some caving and the bore wall has a more irregular surface. Therefore, the average mud-film thickness is somewhat greater: 0.1 in. is probably a typical value.

The resistivity R_1 of the mud film is equal to R_m, mud resistivity.

Permeable beds.—The thickness T_1 of the mud cake found on the face of a permeable formation depends upon many factors, but it is generally of the order of 1/6 in. The mud cake resistivity R_1 is close to twice the mud resistivity.[1] The resistivity of the mud-invaded zone of a permeable formation is equal to several times the mud resistivity, usually ranging from 6 R_m in very porous beds, to about 200 R_m for low-permeability rocks. Hence, the usual range of the ratio R_2/R_1 for permeable beds is 3-100.

The foregoing figures will be used to illustrate the following discussion.

Two media.—This condition corresponds to impervious formations and to permeable formations which are appreciably invaded by mud. The resistivity of the second medium is generally greater than that of the first medium, i.e., $R_2 > R_m$.

The numerical value of the apparent resistivities given by the MicroLog depends not only upon the resistivities and thicknesses of the media and upon the type of electrode arrangements used, but also upon the dimensions of the electrode pad and upon the size of the hole. In this discussion, the effect of these last two factors will be taken into account qualitatively only because the shape and size of the most efficient and practical logging tool have not been exactly determined as yet for each type of formation. Nevertheless the conclusions which will be arrived at apply fairly well to the current types of logging arrangements.

If the hole diameter is large with respect to the electrode spacings, 20 in. or more for example, the curvature of the bore can be neglected, i.e., a flat surface can be substituted for the bore wall for the purpose of this discussion. If the surface of the pad is large, most of the logging current flows in media 1 and 2 and almost no current flows in the drilling mud around the pad. The condition is therefore identical to that found in surface exploration when the strata are horizontal and the electrodes are moved horizontally at the surface of the ground except that, for logging, the geometry is vertical instead of horizontal. For such condition it is convenient[2] to represent the apparent resistivities by plotting the ratio R_a/R_1 as a function of S/T_1, R_a being the apparent resistivity obtained with a spacing length equal to S. For a typical three-electrode arrangement the data are as shown by Fig. 1. Each curve of the chart corresponds to a given resistivity contrast R_2/R_1.

The case of a compact formation will be investigated first. Its resistivity R_2 is practically infinite. It will be assumed that T_1, thickness of Medium 1 (mud film), equals 0.1 in. From the chart of Fig. 1 it is easy to obtain the curve representing, for this condition, the variations of the apparent resistivity R_a/R_1 given by the log as a function of the electrode spacing. This curve is reproduced as the interrupted line 0.1 of Fig. 2 for convenience. If the mud-film thickness were greater than 0.1 the corresponding curve would be shifted to the right, as shown by the interrupted line 0.2 which corresponds to $T_1 = 0.2$.

The foregoing data are for hole diameters greater than about 20 in. Usually the bore is of smaller size. It is obvious that, in this case, the apparent resistivities are somewhat reduced, especially when long spacings are considered. Furthermore, if the pad surface is not very large, as is generally the case, some of the logging current flows in the mud around the pad and this also reduces the apparent resistivities, especially for long spacings. Because of the two foregoing effects the actual curves are more or less as shown by the solid lines of Fig. 2.

In the following it will be assumed that two three-electrode spacings are used simultaneously, the spacing lengths being 1 in. and 2 in. respectively, although any other values could be selected if desired. The apparent resistivities given by these spacings will be designated R'_a and R''_a. If R''_a is greater than R'_a it is said that there is a "positive separation" between the two apparent-resistivity graphs. For example on Fig. 2 the separation of the curve $T_1 = 0.2$ is equal to the difference in ordinates of points R'_a and R''_a: its value is positive and it is represented by the vertical arrow. If R''_a is less than R'_a, there is a negative separation.

Nonpermeable Beds

Hard formations.—In hard formations, the bore wall is fairly smooth. Hence, if the electrode pad fits the wall surface there is only a very thin mud film, perhaps 0.01 in., between the electrode pad and the formation. The apparent resistivities ob-

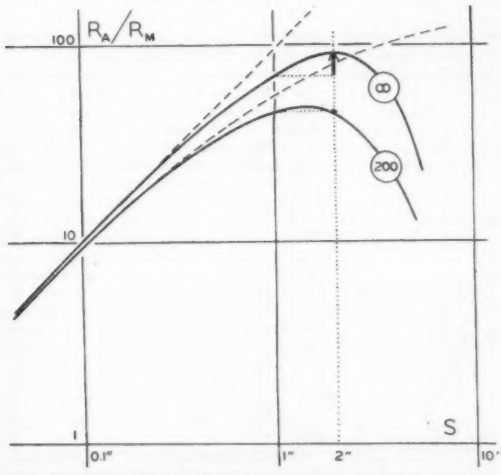


Fig. 3—DENSE FORMATION.—Apparent resistivity of a dense formation when the mud-film thickness equals 1/100 in. Figures in circles denote resistivity contrast R_2/R_m.

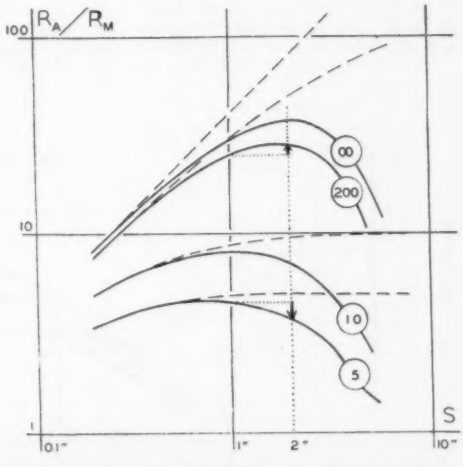


Fig. 4—IMPERVIOUS FORMATION.—Apparent resistivity of an impervious formation when the mud-film thickness equals 1/40 in. Figures in circles denote resistivity contrast R_2/R_m.

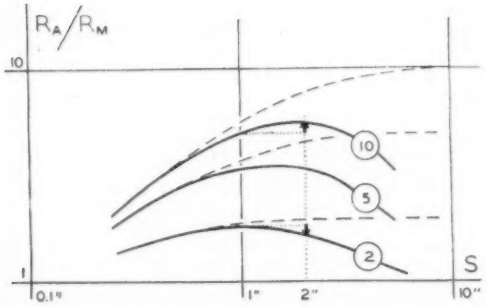


Fig. 5—IMPERVIOUS FORMATION.—Apparent resistivity of an impervious formation when the mud-film thickness equals 1/10 in. Figures in circles denote resistivity contrast R_2/R_m.

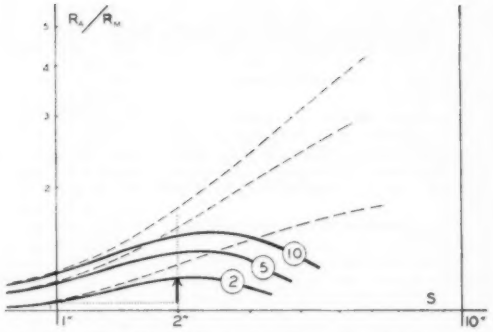


Fig. 6—IMPERVIOUS FORMATION.—Apparent resistivity of an impervious formation when the electrodes are approximately 1 in. from the bore wall. Figures in circles denote resistivity contrast R_2/R_m.

tained in this case are represented by the solid lines of Fig. 3. The interrupted lines show the hypothetical curves corresponding to a large bore diameter and to a pad of very large dimensions. For dense formations the ratio R_2/R_1 is greater than 200 and R_1 equals R_m. Therefore the apparent resistivities are comprised between the curves 200 and ∞ and the ratio R_a/R_m is usually greater than 40. The separation is positive on extremely dense formations (upper curve) and can be somewhat negative in formations having some conductivity (lower curve). The dividing line is controlled by the exact thickness of the mud film and by the dimensions of the pad.

If the bore wall is somewhat rough, the average mud-film thickness is greater than 0.01 in.: 0.025 in. is probably a typical figure. The solid line curves 200 and ∞ of Fig. 4 show that in this case the apparent resistivities are less than for a mud film of 0.01 in. Nevertheless the ratio R_a/R_m is generally greater than 20. In practice, the lower limit is of about 30 for usual electrode pads. The separation is generally positive.

To summarize: in hard formations, the apparent resistivities are much smaller than the true resistivities, but the ratio R_a/R_m is generally greater than 30. The separation is more frequently positive than negative.

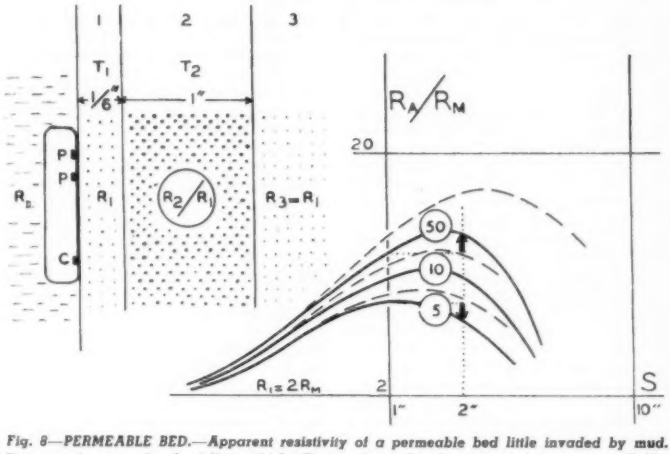


Fig. 8—PERMEABLE BED.—Apparent resistivity of a permeable bed little invaded by mud. Data are for a mud cake 1/6 in. thick. Figures in circles denote resistivity contrast R_2/R_1.

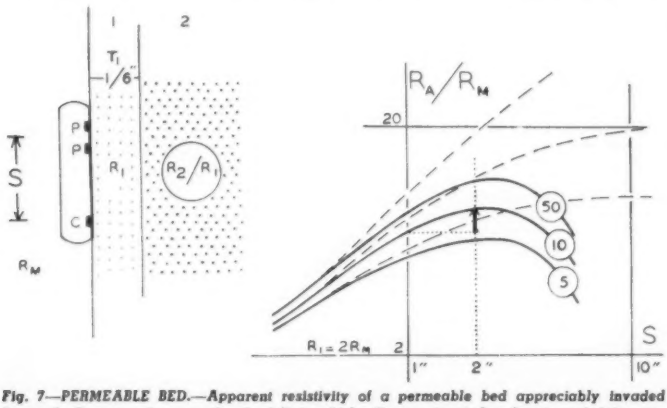


Fig. 7—PERMEABLE BED.—Apparent resistivity of a permeable bed appreciably invaded by mud. Data are for a mud cake 1/6 in. thick. Figures in circles denote resistivity contrast R_2/R_1.

Shale and clay.—For shale and clay the ratio R_2/R_1 is usually less than about 10, R_2 being the formation resistivity. If the bore wall is smooth, T_1 is small and the lower curves of Fig. 4 give approximately the apparent resistivities obtained. The separation is usually negative. If the bore wall is irregular, for example when there is some minor caving, T_1 has a greater value and the data are given approximately by Fig. 5 which corresponds to $T_1 = 0.1$ in. It can be seen that the separation is always small: it is negative for most shales because their resistivity is generally not much greater than the mud resistivity. On the other hand the separation can be positive if the ratio R_2/R_m is relatively high, for example 10 or greater.

Caving formation.—If there is such large caving that the electrodes are several inches from the bore wall the measurements are related only to the mud: The apparent resistivities

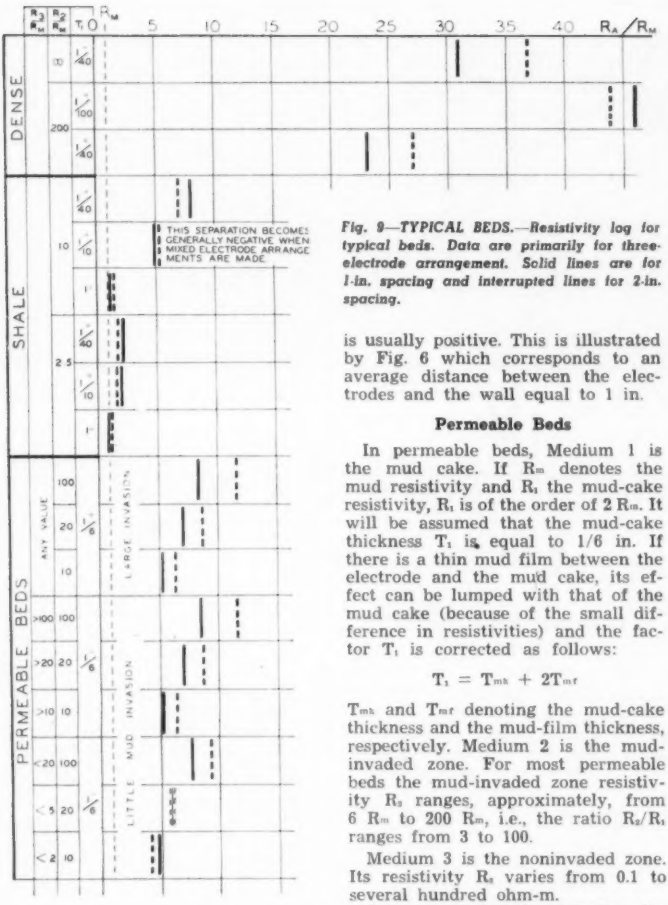


Fig. 9—TYPICAL BEDS.—Resistivity log for typical beds. Data are primarily for three-electrode arrangement. Solid lines are for 1-in. spacing and interrupted lines for 2-in. spacing.

equal approximately the mud resistivity R_m and there is of course no appreciable separation.

When the caving is moderate but such that the electrode pad does not quite touch the bore wall, the apparent resistivities are somewhat greater than R_m and the separation is usually positive. This is illustrated by Fig. 6 which corresponds to an average distance between the electrodes and the wall equal to 1 in.

Permeable Beds

In permeable beds, Medium 1 is the mud cake. If R_m denotes the mud resistivity and R_1 the mud-cake resistivity, R_1 is of the order of 2 R_m. It will be assumed that the mud-cake thickness T_1 is equal to 1/6 in. If there is a thin mud film between the electrode and the mud cake, its effect can be lumped with that of the mud cake (because of the small difference in resistivities) and the factor T_1 is corrected as follows:

$$T_1 = T_{mk} + 2T_{mf}$$

T_{mk} and T_{mf} denoting the mud-cake thickness and the mud-film thickness, respectively. Medium 2 is the mud-invaded zone. For most permeable beds the mud-invaded zone resistivity R_2 ranges, approximately, from 6 R_m to 200 R_m, i.e., the ratio R_2/R_1 ranges from 3 to 100.

Medium 3 is the noninvaded zone. Its resistivity R_3 varies from 0.1 to several hundred ohm-m.

Large mud invasion.—If the distance of mud invasion is large with respect to the electrode spacings, i.e., more than about 6 in., Medium 3 does not influence the measurement appreciably and two medium curves can be used. Typical response is represented on Fig. 7 which shows that the apparent resistivities are relatively small; nevertheless they are generally greater than for shales. The ratio R_3/R_1 is usually less than 10, i.e., R_3/R_m is less than 20. The separation is positive and large. The higher the formation factor, the greater the separation, all other conditions being the same.

Little mud invasion.—If the distance of mud invasion is less than about 6 in. it is necessary to take Medium 3 into account in the interpretation of the data. Two cases have to be considered:

1. The resistivity of the noninvaded zone is equal to, or higher than, that of the invaded zone, i.e., R_3/R_2 is equal to or greater than 1. Under such condition the resistivity chart is very similar to that obtained for large invasion (Fig. 7). The only difference is that the right portion of each curve may be somewhat higher, but this does not change, basically, the response. Hence, the conclusions arrived at for a large mud invasion apply also to this case.

2. The resistivity of the noninvaded zone is less than that of the invaded zone, i.e., R_3/R_2 is less than 1. In this case the resistivity curves of the charts drop still further, as shown by Fig. 8, established for $T_1 = 1/6$ in. and for a distance of invasion of the order of 1 in. The plain curves represent the actual apparent resistivities, while the interrupted lines—shown for comparison purposes—are for the hypothetical case of measurements taken in a hole of very large diameter and with an electrode pad of very large dimensions. It can be seen that the apparent resistivities drop rapidly when the electrode spacing increases: the lower R_3, the greater the drop. The smaller the degree of mud invasion and the smaller the formation factor, the smaller the apparent resistivities. The separation is usually negative, except when the resistivity of the mud invaded zone is very large (Curve 50).

If there is less than about 1 in. of invasion, the right portion of the curves drops further and the separation is always negative.

(Continued on page 112)

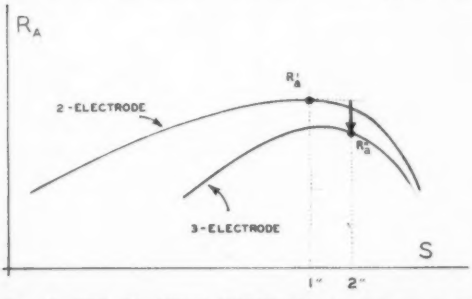


Fig. 10—TWO VS. THREE ELECTRODES.—Comparison of data given by two-electrode arrangement and by three-electrode arrangement on a shale bed.

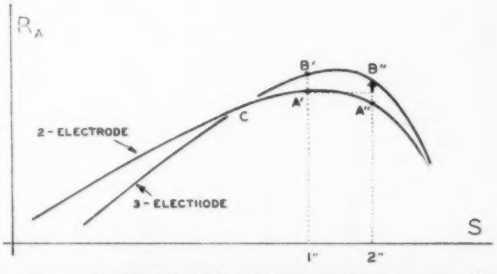
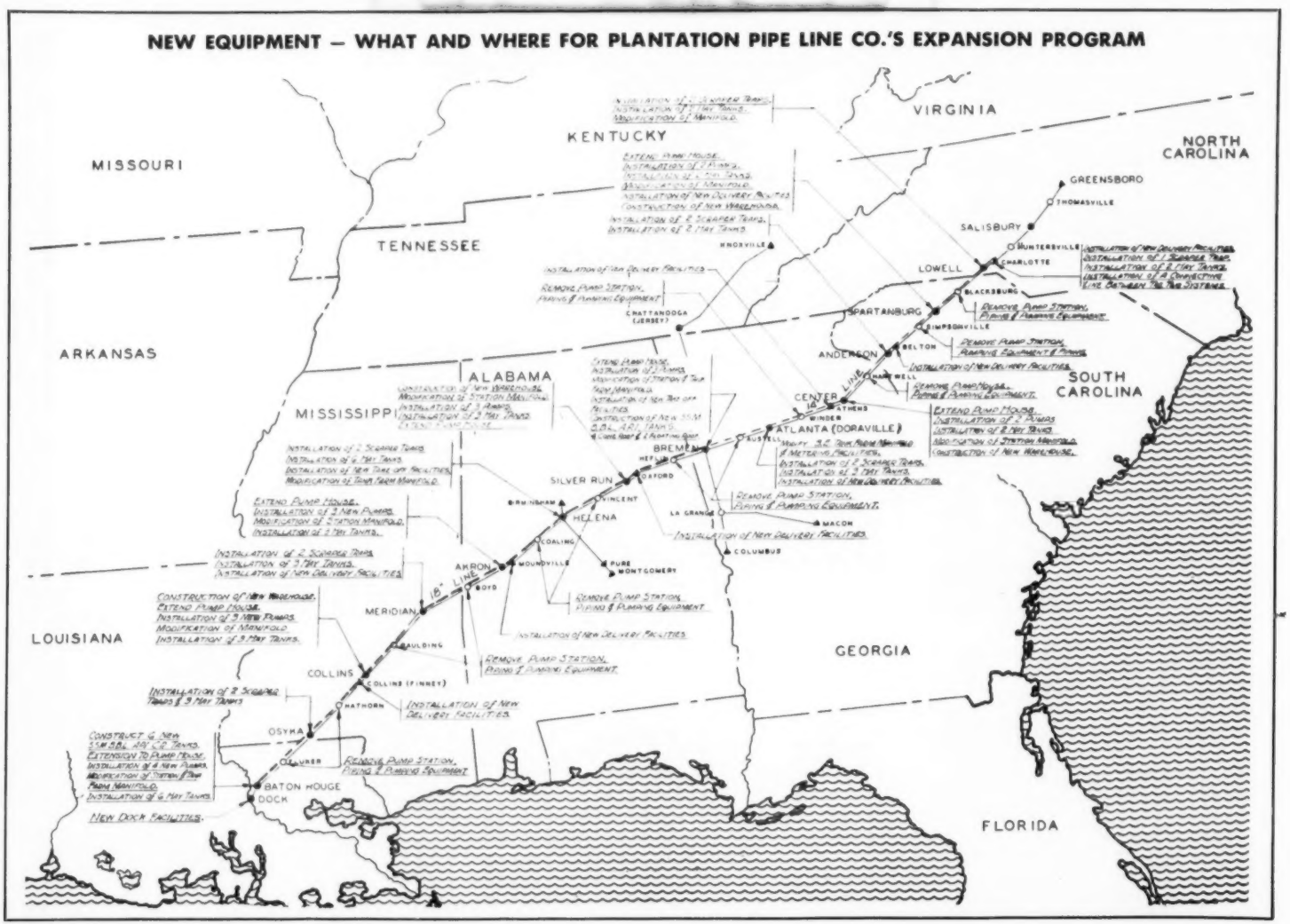
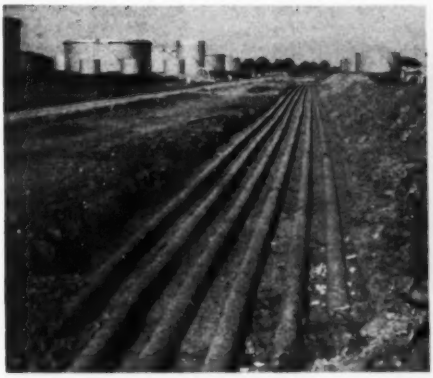


Fig. 11—MIXED-ELECTRODE ARRANGEMENTS.—Illustration of the reversal of the separation sign when mixed-electrode arrangements are used on a permeable bed.

NEW EQUIPMENT — WHAT AND WHERE FOR PLANTATION PIPE LINE CO.'S EXPANSION PROGRAM





Lines being laid to new tankage at Baton Rouge terminal tank farm.

Large storage tank under construction. Type of sump in foreground was devised to facilitate effective draining.

Plantation's Big-Inch Expansion . . .

achieves four-way transportation economies

by Paul Reed
Pipe-Line Editor

PLANTATION PIPE LINE CO. is placing in operation the first commercial big-inch products line in the initial step of a $52,000,000 expansion program. This project adds a 707-mile parallel line of 18-in. and 14-in. which will raise capacity to the highest of any products pipe-line system. Capacity is being increased from present throughput of 95,000 bbl. so that by next summer it will be up to 221,000 bbl. daily. Recent work has already brought capacity up beyond a halfway mark to 185,000 bbl. daily, by pipe laying and pump installations which are well ahead of schedule.

By ingenious and far-sighted planning under the direction of C. R. Younts, president, the new facilities will achieve important transportation economies in four ways through (1) lowering power requirements incident to reduced fluid friction losses characteristic of big-inch pipe; (2) speeding up deliveries by segregation of most fuel-oil shipments in the smaller of the two parallel lines; (3) eliminating 12 intermediate pump stations, and (4) applying advanced operating techniques.

Consequently the present record-breaking low barrel-mile products line costs of Plantation will be still further reduced.

From the start of operations in 1942, Plantation has been conspicuous by advancements, both in techniques and development of management policies, for increasing efficiency through closer relationships between the management and operating personnel.

Exceptional in products pipe lining is the established procedure by which Plantation handles shipments separately. All shipments are moved separately for each shipper; and are delivered at destination in shippers' tanks.

The principal innovations for the expanded Plantation system include electric strain gages for pressure control, complete application of mechanical seals throughout the system, adoption of dual printer heads in metering, and special sumps for storage tanks.

By careful attention to maintaining uniformity of operation, Plantation has reduced electro-power costs and products losses to a minimum.

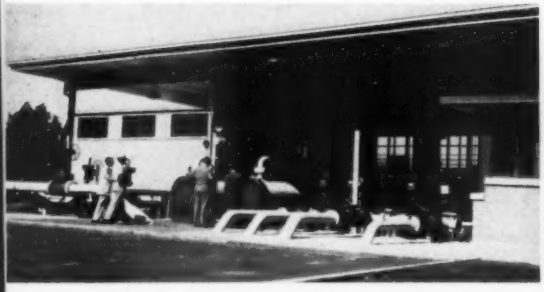
The original Plantation system built 10 years ago was characterized by advanced practices including push-button control to facilitate one-man station operation, metering of products, closed-system operation with automatic pressure control, motor-operated valves, and teletype. Architectural design of buildings and station supervisors' residences were of such distinctive quality as to appropriately place them in their environment.

Electrical strain gages.—A significant advance in station control is the adoption of electrical strain gages which will be installed in all Plantation pump stations. Pressure measurements and control of the entire system will be accomplished through wire strain-gage pressure cells.

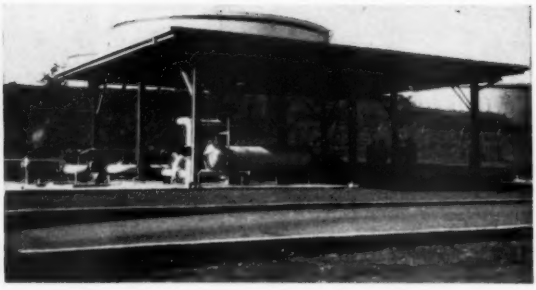
Unlike conventional bourdon gages, these cells do not require frequent calibration by special technicians. No tubing for products comes to the control panel in the station. Pressure is measured directly in the line. Higher accuracy is possible. The tubes are unaffected by pressure pulsations on the pumps. An electrical instrument for calibrating a strain gage can be operated by push button.

Pressure variations are transmitted to the instrument panel by four 8-volt lines carrying less than 0.1 amp. electric current and using less than 1 watt of energy. Pressure cells consist of a pressure-sensitive tube in the pressure system of the pipe line. Resistance wire strain gages are bonded on the outside of the tube. Slight expansion or contraction of the tube, caused by pressure changes, stretches or relaxes the fine wire-grids of the gage, increasing or decreasing its electrical resistance. This change of resistance is measured by various types of instruments for indicating or recording the pressure or for controlling the pumps.

Rate of flow control.—Experience with rate of flow-control equipment at the initial pump station at Baton Rouge has demonstrated its ability to avoid excessive demands for electric power by preventing operation at rates which would create an unnecessarily high power demand for a short time. The leveling effect of this



Pump station and manifold at Bremen terminal.



Scraper trap and hay-tank at extension of Bremen terminal.

instrument is accomplished by setting it at the desired rate of flow which is automatically maintained by actuating an automatic control valve in the line. Because of the success of this control at Baton Rouge a unit of the same kind will be installed at the Bremen station.

Mechanical seals.—This year the company is having mechanical seals installed at all pumps throughout the system. This is a consequence of pioneer experimental work carried on at the Doraville station near Atlanta in recent years. Mechanical seals are of the type developed for high pump speed of 3,600 r.p.m. designed to function without trouble for 10,000 hours.

Mechanical seals have made substantial reductions in vapor loss by eliminating repumping of products in connection with pressure reduction at pump glands. The resulting increase in station efficiency amounting to 1 per cent has been indicated in electric-power bills. Sump tanks are used only in emergencies at stations equipped with mechanical seals.

Dual printer head.—The advantages of dual printer heads with counters installed on meters are fourfold: (1) they remove chances for errors; (2) they reduce the number of meters required; (3) they save time of one man; (4) they reduce switching errors. A feature of the type of heads used by Plantation is that printing for recording is not instantaneous. Sufficient time is given to complete the record of 1 bbl. on a ticket before recording starts on another ticket. Greater accuracy is possible because of the quick switching of the meters.

At all critical delivery points where several shippers take deliveries at high rates, dual printer heads are being installed. This is another result of tests carried on at Plantation's Doraville station.

Tank sumps.—All storage tanks on Plantation's system are provided with sumps 20 ft. in diameter and 4 ft. deep. These sumps, which are fabricated like tanks and weighted with concrete, facilitate complete draining of the large tanks they serve so as completely to eliminate the possibility of contamination in change of products.

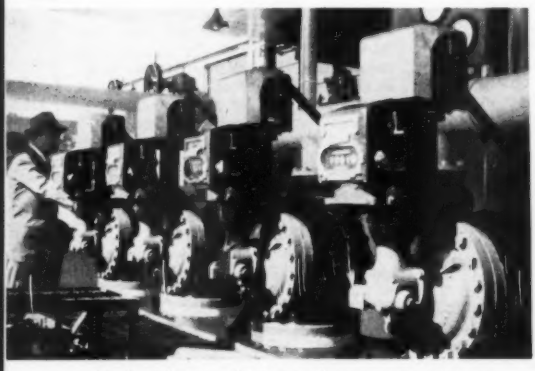
Antiswirl devices consisting of baffles at the ends of the pipe make it possible to maintain pumping rate to the last drop while emptying. Rounded edges of the sump minimize static generation. Storage tank sump practices developed by Plantation have been adopted by other pipeline systems.

Dispatching and communication.—A special new control board has been built to serve the new system. Methods of dispatching will continue according to practices which have been established for the company's systems. Teletype communication is over leased wires to provide dispatchers and operators with a printed record of all orders and reports.

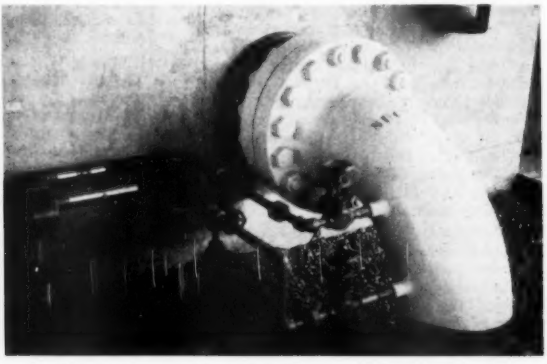
Scraping.—During the early operation of the new lines, scrapers will be run every week. Internal corrosion is kept to a minimum by the use of sodium nitrite as an inhibitor. Suspended matter is removed in hay tanks and strainers to protect the meters.

Pipe protection.—All of the new lines are entirely coated. The original line built 10 years ago was only spot coated. Cathodic protection will be applied immediately after construction. In advance of building the lines, corrosion engineers determine the location for taps for cathodic protection. Taps for this purpose have been installed by Plantation men during line construction.

Shippers on the Plantation system have been recently increased to a total of 15. Each shipper provides his own tankage and receiving facilities at delivery points along the Plantation system. This is in accordance with the transportation arrangements characteristic of Plantation and which make its operations dif-



M. J. Dabney, technologist, Plantation Pipe Line Co., examining dual printer heads at Doraville station.



New strain-gage pick-up installation at Athens, Ga., pump station.

ferent from those of other products pipe lines.

All shipments are moved in batches definitely identified with the shippers who own them. Consequently Plantation only provides storage for shippers at the originating terminal at Baton Rouge. Such storage is only provided for shipments during the month in which they are scheduled.

Products shipped.—Products handled through the Plantation system include house-brand gasoline, premium gasoline, third-grade (65-octane) gasoline, tractor fuel, kerosine, No. 2 heating oil, and three grades of diesel fuel. Plantation transports no L.P.G.

Shipments.—The smallest batch received from a shipper is 25,000 bbl.; the minimum delivery at any one point along the line is 2,500 bbl. Cycles are sometimes as much as 500,000 bbl. particularly for fuel oil for winter requirements.

Shippers.—Owners are Shell Oil Co., Standard Oil Co. (Kentucky) and Standard Oil Co. (N. J.), New shippers entering the system this year include The Texas Co., Sinclair Refining Co., and Republic Oil & Refining Co. Other shippers include: Pan-Am Southern Corp., Arkansas Fuel Oil Co., Atlantic Refining Co., Pure Oil Co., Gulf Oil Corp., Crown Central Petroleum Corp., American Oil Co., Kenco Terminals, Inc., Esso Standard Oil Co., Gulf Refining Co., Shell Oil Co., and Standard Oil of Kentucky.

Plantation facilities.—The relation between the expansion program and the previously existing systems may be summarized by an outline of each. The 1,260-mile system built 10 years ago include the 812-mile trunk line with the 456-mile, 12-in., Baton Rouge, La.-Bremen, Ga., section and the 356-mile, 10-in., Bremen-Greensboro, N. C., section. Lateral lines totaling 348 miles consist of an 8-in. line from Helena, Ala., to Birmingham and a 4-in. line from Helena to Montgomery, Ala.; a 4-in. line from Bremen to Macon and Columbus, Ga., and 8-in. line from Bremen through Chattanooga to Knoxville, Tenn.

The original line had 60-mile station spacing. During World War II, 14 intermediate stations were built. The system has had 31 pump stations at 30-mile intervals and 18 delivery terminals. Elimination of 12 intermediate stations will result in reversion to the original 60-mile spacing west of Charlotte, N. C.

The expansion program has been planned in two steps. Step 1 is being completed this year includes the construction of the 432-mile, 18-in. Baton Rouge-Bremen, Ga., section to be served by four stations with three pumps in series each operating at 280 psi. to move 100,000 bbl. daily. Also it includes the construction of the 275-mile, 14-in. Bremen-Charlotte, N. C., section to be served by three stations with two pumps in series, each operating at 450 psi. to move 79,000 bbl. daily. In this step original Baton Rouge-Bremen 12-in. line will be converted to fuel service on a reduced throughput basis with seven stations with two pumps in series, each operating at 475 psi. to move 67,000 bbl. daily; the original Bremen-Charlotte 10-in. line will be converted to fuel service with six stations of two pumps each, to operate in series of 475 psi. to move 41,000 bbl. daily.

Through this program for Step 1, the total capacity of the two Baton Rouge-Bremen sections will be 167,000 bbl. while the capacity of the two Bremen-Charlotte sections will be 120,000 bbl.

In Step 2, the 18-in. facilities will be increased by the addition of three more stations making a total of five stations with three pumps each operating at 275 psi. to move 154,000 bbl. daily. The 14-in. facilities will be increased by two more stations making a total of five stations of three pumps each operating at 300 psi. to move 110,000 bbl. daily. The pumping facilities and capacities of the 12-in. and 10-in. sections will remain the same. The added pumping facilities will mean that the total capacity of the Baton Rouge-Bremen section will be 221,000 bbl. daily. For the Bremen-Charlotte section total capacity will be 151,000 bbl. daily.

While the general plan is to have the 12-in. and 10-in. sections to Charlotte carry fuels and to have the 18-in. and 14-in. to Charlotte carry lighter products, there will be an exception to this program during three winter months when fuel may be moved through both the 18-in. and 14-in. lines perhaps to the extent of 400,000 bbl. per month.

Pumping equipment.—The same general plan for pumping facilities which proved to be successful on the original line will be continued in the expanded program. However, the new pumps will be single stage while the pumps on the original line were three stage. All Plantation main-line pumps are Byron-Jackson driven by Westinghouse motors. The pumps for the 18-in. stations are each driven by a 900-hp. motor. Those for the 14-in. stations are driven by 600-hp. motors.

The success of the Plantation Pipe Line Co. in its first decade of operation has run ahead of expectations. In meeting the rapid recent increase in demand for the Plantation's economical transportation, the company is developing facilities to attain even higher efficiencies than those achieved by advances in the original line which have proved to be significant in the techniques of modern petroleum pipe lining.

ONAN

Oilfield

Electric Plants

Model 3CK
3,000 watts,
A. C. or D. C.

HEAVY-DUTY PORTABLE and STATIONERY MODELS

Diesel, Gas, Gasoline-Powered

ONAN oilfield electric plants provide dependable light and power for any oilfield application. A complete range of A.C. and D.C. models, all conservatively rated for continuous, dependable service, helps you choose exactly the right plant for the job. Lightweight, air-cooled models from 400 to 5,000 watts; heavy-duty, water-cooled, gas-gasoline-driven plants from 3,000 to 35,000 watts. Air-cooled Diesel electric plants 2,500 and 5,000 watts. Water-cooled Diesels from 12,500 to 55,000 watts, powered by International Harvester engines.

Write for Oilfield Folder

Onan PRODUCTS

D. W. ONAN & SONS INC.

5815 University Ave. S.E., Minneapolis, Minnesota

QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Ethylene Production

As a user of your book Petroleum Refinery Engineering, we take the liberty of inquiring about up-to-date information on ethylene, its availability, producers, price and price trends. C.E.K.

A major source of information about organic chemicals is "Synthetic Production and Sales" (published yearly) of the U. S. Tariff Commission. The 1949 edition shows 1,151,494,000 lb. of ethylene produced from petroleum sources. Of this, 130,234,000 lb. was sold at an average value of 5.7 cents per pound. Only a small amount of ethylene was made from alcohol and such ethylene sold at a very high price (the price of $1.08 per pound does not seem reasonable).

Many companies produce ethylene as an intermediate product for their own use, but the major manufacturers can be identified from current literature (see Table 1). The production has increased[8] from 166 million pounds in 1943 to 1,151 million pounds in 1949, and Kuhn and Hutcheson[1] believe the 1950 production of 1,536 million pounds will grow to 3,946 million pounds by 1962. The actual productions are probably larger than the above values for 1943-1949 from Synthetic Organic Chemicals because many producers may not report to the U. S. Tariff Commission. Aries[9] shows somewhat larger productions based on the amount of various chemical derivatives of ethylene.

Prices appear to have been in the range of 3-5 cents per pound during 1944-1949. Inasmuch as the cost of the charge stocks from which ethylene is made will increase in the future it is expected that the prices will rise. The prices stated in Synthetic Organic Chemicals indicate that prices dropped between 1944 and 1947 but have since been rising.

TABLE 1—SOME MAJOR ETHYLENE PRODUCERS (See References 2-7)

Carbide & Carbon Chemicals Corp.—South Charleston, W. Va.; Whiting, Ind.; Texas City, Tex.
Celanese Corp.—San Antonio.
Dow Chemical Co.—Midland, Mich; Freeport, Tex.
Du Pont de Nemour Co.—Orange, Tex.
Ethyl Corp.—Baton Rouge, La.
Gulf Oil Corp.*—Port Arthur, Tex.
Jefferson Chemical Co.—Port Neches, Tex.
Imperial Chemical Industries* — Wilton, England.
Koppers Co.—Kobuta, Pa.; Port Arthur, Tex.*
Monsanto Chemical Co.—Texas City, Tex.
Petrochemical, Ltd.*—Partington, England.
Phillips Petroleum Co.—Borger, Tex.
Polymer Corp.—Sarnia, Ont., Canada.
Shell Chemical Co.—Houston (Deer Park).
Southern California Gas Co.†—Los Angeles.
Esso Standard Oil Co.—Baton Rouge, La.
Wyandotte Chemicals Corp.—Wyandotte, Mich.

*Under construction. †Shut down in 1948.

References

1. Anon. Big Future Ahead, The Oil and Gas Journal, Sept. 20, 1951, p. 164.
2. Anon. Ethylene Oxide, Chem. Engineering, July 1950, p. 331.
3. Anon. Ethylene Plant, The Oil and Gas Journal, Feb. 8, 1951, p. 65.
4. Egloff, G., Chemicals from Petroleum, The Oil and Gas Journal, Aug. 30, 1947, p. 88.
5. Foster, A., Ethylene . . . Petroleum Eng., Sept. 1951, p. C-3.
6. Lowe, A. J., Ethylene Oxide . . ., Petroleum (London), July 1951, p. 182.
7. Smoley, et al., quoted on Questions on Technology page, The Oil and Gas Journal, Jan. 22, 1948, p. 77.
8. Nelson, W. L., Petrochemical Manufacture I, The Oil and Gas Journal, May 24, 1951, p. 145.
9. Aries and Copulsky, Use of Olefins for Chemical Production, The Oil and Gas Journal, July 6, 1950, p. 54.

Engineering Design Diagram for Crude Oil

You have been active in developing crude-oil-analysis diagrams by which the yields of products can be determined. What about crude-oil diagrams for making design calculations? Are there such diagrams? R.F.N.

Process-design computations cover such a wide range of purposes that standardized crude-oil or charge-stock diagrams are of little practical value.

In design work there is frequent need of quantities (gallons per hour, etc.), gravities or densities, molecular weights, specific heats, and so on, and although some of the properties might be plotted on a crude-oil or charge-stock diagram, it is usually easier to look them up as they are needed. Most of these properties are related to the atmospheric-pressure midboiling points or to the gravity of fractions of the charge stock. Thus, a true-boiling-point curve and a gravity mid per cent curve are all that are required.

The only other type of curve that appears to be widely useful in design work is the equilibrium flash vaporization curve. Inasmuch as distillation of the stock is seldom conducted at atmospheric pressure, it might be useful to provide flash vaporization curves for several pressures as indicated in Fig. 1. Such curves are most useful in the lower ranges of percentage.

Finally, once-flashed or residual stocks may be subjected to a second-flash vaporization, and the flash vaporization curves of various percentages of residual stocks might be drawn as indicated in Fig. 1 as dotted lines.

Such curves might in time become useful to a designer by enabling him to compare various crude oils or charge stocks, but design work is usually of such an original nature that standardized design curves are probably of little value. Fig. 1 does, however, indicate the effect of pressure on flash vaporization temperatures, and it shows the relative positions of the flash curves of residual stocks and the parent stock. It is seen that vaporization does not start when at 200 psia., until a temperature of 367° F. is attained, or at the same pressure, 18.6 per cent will be vaporized at a temperature of 500° F. Likewise, it can be seen that 63.5 per cent of the crude can be vaporized by a single flash vaporization (at atmospheric pressure) at a temperature of 610° F., but a temperature of 700° F. is required if a two-flash system is employed in which the second flash is conducted on a 70 per cent topped crude oil, or even 750° F. if the topped crude is a 50 per cent topped crude.

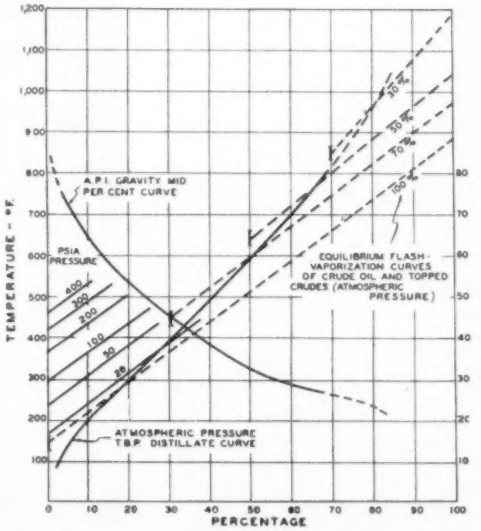


Fig. 1—Curves that are useful in process design. (A 34°-gravity A.P.I. Mid-Continent petroleum.)

CORROSION and its control

Corrosion Test Specimens

ONE of the available methods for coping with the attack of corrosion is the substitution of a material less subject to the action of the particular environment concerned. Often such a substitution may lead to an over-all saving, even when the attack is not disastrously serious in the first place. Petroleum refineries and petrochemical plants, with their high investment costs, lend themselves particularly well to this mode of treatment. And, with the high temperatures, pressures, and flow velocities in such plants, and the variety of fluids handled, they do not lack for corrosion problems.

When such an establishment has been in operation for some time, the locations of trouble spots are well known to the operators; there may also be other locations, not considered troublesome, where a reduction in corrosion rate would result in a saving. When a plant is first put into operation, or when an existing plant undergoes some change in process or in the nature of the raw materials, there is always a possibility of corrosion trouble developing where none had been experienced. In any of these cases, it will often be desirable to test several alternate materials in some particular corrosive or potentially corrosive point in the stream. Simple as this is in principle, there are numerous cautions which must be observed in order to obtain results of even moderate reliability—and at best, such results are only tentative.

Precautions

The precautions to be observed may be divided into two categories; the preparation and subsequent cleaning and weighing of the specimens, and the mounting of the specimens for the exposure. The most reliable method of assessing the corrosion rate is by the loss in weight of specimens over a time interval; in order to facilitate this measurement, thin pieces should be used, so that a high area-to-weight ratio is maintained. Specimens must be mounted so that no metallic contacts exist between different specimens, or with the walls of the vessel. A standard has been recommended[1] which incorporates the necessary features insofar as mounting is concerned.

Placement within the fluid under consideration is important. In order to duplicate as nearly as possible the normal exposure of the vessel walls, specimens should be placed so that the flow of fluid is parallel to the plates. If the exposure is in a vapor, or if the flow is slow or intermittent, the planes of the specimens should be placed vertically, so that there will be no dripping of corrosion products from one plate to another. Special cases often require special treatment, or even design of special test racks; there is room for much ingenuity in their design and placement.

Surface Finish

It is usual in describing the initial preparation of specimens to place considerable emphasis upon surface finish. Various kinds of polishing and sanding are recommended for different materials. It may be objected that such treatment could easily influence the progress of the corrosion reactions, and that the finishes recommended for specimens are not typical of those in ordinary use in vessels and piping. This is largely true, yet it is still necessary to employ careful surface finishes on specimens, solely for the reason that extreme cleanliness is required, in order that the weighing operation shall truly reflect the weight of the material under test, and not include grease, dirt, and other contaminants. For similar reasons it is important to protect the weighed specimens from even slight exposure to atmospheric moisture, although certainly such precautions are not ordinarily taken with the same materials in actual service.

In determining the weight loss after exposure, it is necessary to clean the corrosion products from the specimens. Three general methods are available for cleaning: mechanical, such as scraping and brushing; chemical, employing suitable solvents; and electrolytic, which involves making the specimen the cathode in an alkaline or inhibited acid electrolyte. Combination methods may be used, but regardless of what cleaning procedure is employed, one rule should be followed if accurate results are to be had; an uncorroded specimen of the identical material (prepared by the same procedure used for the exposed specimens) should be subjected to the identical cleaning procedure, in order to determine the weight loss of the metal itself in cleaning. Electrolytic cleaning methods may sometimes introduce an opposite error, by the accidental deposition on the specimen of ions of metal such as copper or silver from a preceding specimen.

Fundamental Principles

It is difficult to make general recommendations as to the selection of materials to be tested in this way, but some principles can be stated. The range should always be extended to include both materials considered more resistant (and usually more expensive) than required for the particular problem, and materials deemed inadequate; sometimes there are pleasant surprises to be had. If the test is for the purpose of selecting a replacement material for one which is not performing in a satisfactory manner, specimens of the material already in use should be included, to shed some light on the adequacy of the test itself. At least two specimens of each material under consideration should always be included.

One additional source of potentially useful information should not be overlooked. Before cleaning the specimens, and while this is in progress, observations should be made and recorded as to the appearance and nature of the corrosion—color of products, consistency, staining or apparent film formation, etc. Likewise the distributive nature of the corrosion on the cleaned specimen should be noted, and the depth of pits measured. Even if the observer carrying out the work is not able to draw any inferences or to identify any of the compounds seen, information may become available later which will shed valuable light on the nature of the process involved.

Reference

1. "Recommended Practice for Conducting Plant Corrosion Tests," Proc. A.S.T.M., 35:349-360 (1935).

Part 38 of a series by Marshall E. Parker, consulting engineer, Houston.

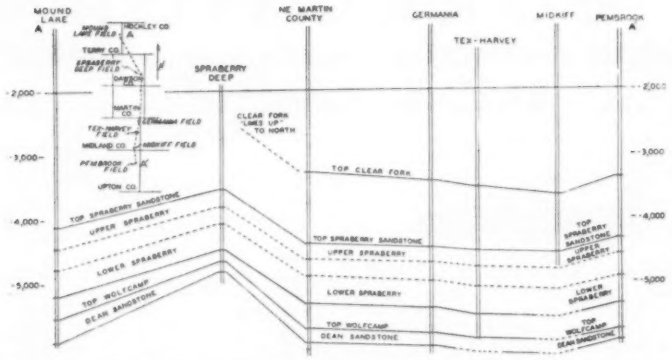


Fig. 3—Generalized north-south cross-section extending from Pembrook field, Upton County, Texas, to Mound Lake field, Terry County, Texas.

That Spectacular Spraberry

(Continued from page 101)

north and deep-seated Ellenburger structures in the south portion of the Spraberry trend area produce anticlinal-type structures of major relief that account for accumulation in these immediate areas in the Spraberry sandstone section.

A regional structure map on top of the Spraberry sandstone with 500-ft. contour intervals is shown in Fig. 1, and illustrates all of the producing areas of the Spraberry sandstone in the Midland basin area. To the eastward and northeastward the Spraberry sandstone grades to a dominantly limestone section whereas westward and southwestward the Spraberry sandstone sections grades to an undifferentiated sandstone and shale section, becoming primarily shale to the west and adjacent to the east portion of the Central Basin platform.

Two general types of traps are in evidence throughout the Spraberry trend, one being the anticlinal type having apparent established water tables. The other type is the monoclinal - nose type with permeability pinchout due to lateral gradation of the sandstone updip or downdip. This occurs in both the upper and lower Spraberry sections.

The Spraberry is productive structurally ranging from —2,500 to —5,000 ft. subsea datum on top of the Spraberry. It should be noted that of the two types of traps which occur in the Spraberry trend, the anticlinal-type fields are Flatrock Spraberry and Benedum Spraberry in Upton County, both related to a deep-seated Ellenburger structure; Warfield South Spraberry in Midland County and Glass Spraberry in Martin County, directly related to Pennsylvanian structures; Spraberry Deep field, and Snowden Spraberry field, Dawson County, being related to a Pennsylvanian limestone "reef" buildup beneath the Permian section. Likewise in Borden County, Northeast Gail field is also related to a Pennsylvanian limestone buildup. All of the other producing areas of the Spraberry trend have accumulation associated with broad monoclinal noses with very minor structural closure.

Fractured Conditions

It is only appropriate that the fractured condition of the Spraberry sandstone be mentioned at this stage of discussion because this condition is more or less directly related to the accumulation of oil in the Spraberry sandstone sections, both upper and lower, relative to structural development. Fracturing in both the upper and lower Spraberry sections is more dominant in the south portion of the Midland basin than in the north.

Eastward limit.—On Fig. 1 the regional eastward extent of the Siluro-Devonian deposits has been indicated, and this also is the regional approximate eastward limit of the productive section of the Spraberry. Westward of this area of demarcation fracturing becomes more evident in the Spraberry section. This condition, taken into consideration with the downwarping of the pre-Permian section present in the Midland basin, and with subsurface data indicating that unconformities occurred between each of the pre-Permian sections, suggests the presence of positive areas during and subsequent to the deposition of each of these pre-Permian strata through Pennsylvanian time.

However, after Pennsylvanian time and through middle Leonard time, there was an apparent period of rather uniform regional quiesence which included the period during which the Spraberry sandstone members were being deposited. Later, during middle Leonard time there is an indication that these positive areas reoccurred, evidencing themselves in the Clearfork section and especially so at the end of San Angelo Permian time, there being much truncation with back-and-fill occurring at the end of San Angelo time.

The movement necessary to develop this condition should have been sufficient to cause fracturing to develop in the shale sections of the Spraberry formation. Therefore, postulating an extended period of quiesence during deposition of the lower Permian section, and specifically so through the Midland, Glasscock, Upton, and Reagan area, it is possible to visualize formation of a continuous vast fractured reservoir throughout this four-county area in the Spraberry trend.

Fig. 2 shows a typical electric log, induction log, gamma-ray curve, and MicroLog, indicative of the Spraberry section as found throughout most of the Spraberry trend area. The upper Spraberry section contains three well-developed sandstones with intervening shales, argillaceous limestone, and calcareous shale members. The middle Spraberry is approximately 310 ft. thick and is primarily shale with some limestone developed.

The lower Spraberry contains four well-developed sandstone sections with intervening shales and limestones, predominantly shale. A comparison of the upper and lower Spraberry sections indicates that in the upper Spraberry the No. 1 and No. 3 sands are the most prolific relative to production of oil. In the lower Spraberry section the No. 4, the lowermost sand of the lower Spraberry, is the most prolific, especially in areas where anticlinal type structures are dominant.

A generalized north-south cross-section extending from Pembrook field in Upton County to Mound Lake field in east-central Terry County is shown in Fig. 3. It is primarily shown to indicate the continuity of the upper and lower Spraberry sections with relationship to the Wolfcamp and the Dean sandstone section beneath.

Principles of MicroLog Interpretation

(Continued from page 105)

If there is several inches of mud invasion, 2 to 4 in. for example, the apparent resistivities are evidently comprised between the values given by Figs. 7 and 8: the separation is very small and can be either positive or negative, depending upon the exact mud-coke thickness, degree of invasion, and pad design.

It is extremely important to note that, in permeable beds, the apparent resistivities of the MicroLog are fre-

READY WILLING AND ABLE

to unload your well in the

QUICKEST TIME

THE GUIBERSON "J" TUBING SWAB CUP

Any load you can safely handle will come up with the "J"—the tough, heavy-duty cup that's designed to bring out everything but the tubing! Extremely durable, fast falling. No down-swabbing, no hanging on collars. Long, strong flexible lip for perfect up-stroke seal.

"L" Cup for medium and light loads.

"K" Cup for light loads in medium and shallow wells.

"GW" Cup for last-cupful unloading of shallow wells.

The Guiberson "J" Cup will bring up anything you want to lift! Look for it in the Yellow Box!

GUIBERSON

CORPORATION

ESTABLISHED 1919 • DALLAS, TEXAS, U. S. A.

Sold By Leading Oil Field Supply Stores Everywhere

write TODAY for descriptive swab pamphlet

quently greater than the true formation resistivity, while this never occurs in nonpermeable formations.

Charts 7 and 8 are for a mud-cake thickness of the order of 1/6 in. nevertheless the conclusions arrived at apply also to larger thicknesses, qualitatively at least.

Interpretation Rules

The foregoing discussion is summarized on Fig. 9. Although this paper does not cover all possible cases, it can be seen that, **generally:**

1. Permeable beds are characterized by resistivities which are comprised between 3 R_m and 20 R_m, and by a positive and large separation.

2. Shale and clay have resistivities smaller than 3 R_m and they exhibit a negative separation.

3. Dense formations have resistivities greater than 20 R_m and they exhibit a positive separation.

Another important rule which does not seem to have exceptions is:

4. If the apparent resistivity given by the MicroLog is greater than formation resistivity, then the formation is permeable.

There are exceptions to the first three rules, as is obvious from the charts illustrating this discussion, but the conditions under which these exceptions occur are not frequent. Nevertheless for a correct interpretation of the log it is advisable that all other data be used, in particular the conventional electric log, caliper log, and radioactivity log.

The foregoing discussion applies primarily to cases where the mud resistivity is not too small. When the mud is salty the preceding rules, except Rule 4, do not apply as generally and it is imperative that the interpretation be made on the strength of all data available. From these data it is frequently possible to establish resistivity charts similar to those here presented, and from which the log can be accurately analyzed.

Best Type of Electrode Arrangement

The foregoing data are primarily for three-electrode arrangements, although they apply basically to two-electrode arrangements also. Fig. 10 compares the response of these two different arrangements in a shale having little caving. It can be seen that two-electrode arrangements give generally higher apparent resistivities than three-electrode arrangements, although the shape of the curves is substantially the same. In the particular case of Fig. 10 each curve, used alone, exhibits only a small negative separation. On the other hand, if a two-electrode arrangement is used for the small spacing (1 in.) and a three-electrode arrangement for the longer spacing (2 in.) there is a substantial negative separation, as shown by the arrow.

Fig. 11 is a similar chart except that it applies to a permeable formation moderately invaded by mud. The two curves cross each other at point C. It can be seen that, for spacings greater than the abscissa of C, the three-electrode apparent resistivities are greater than those given by the two-electrode arrangement. This produces an interesting singularity: if the conditions are such that the pertinent interpretation curves are approximately as shown by the figure, the separation for the two-electrode arrangement (points A'A") is negative, as well as for the other arrangement (points B'B"). On the other hand, if one uses a two-electrode arrangement for the short spacing and a three-electrode arrangement for the longer spacing, the separation (points A'B") becomes positive.

Therefore if two different types of electrode arrangements are used and if the electrode pad is appropriately designed it is possible to enhance the magnitude of the separation and sometimes to reverse its sign so that the simplified rules of interpretation outlined above apply in the majority of the cases. In particular, the positive separation exhibited by the shale $R_i/R_t = 10$, $T_t = 1/10"$ (Figs. 5 and 9) becomes negative when mixed electrode arrangements are used.

Because of their better performance, mixed arrangements are almost always used at the present time. When electrode pads of various designs will be used, it is probable that the usefulness of the MicroLog will be further increased.

All the foregoing discussion applies to electrode pads of usual dimensions. It is evident that the magnitude of the MicroLog resistivities and the sign and amplitude of the separation change when the size and shape of the pad are quite different from those of the conventional type. There are not enough data available at present to permit a discussion of this effect in this paper.

References

1. H. G. Doll, "The MicroLog—A New Electrical Logging Method for the Detailed Determination of Permeable Beds," A.I.M.E. T.P. 2880, June 1950.

2. Hubert Guyod, "Electrical Logging Developments in the U.S.S.R., Part 1," World Oil, Dec. 1947.

3. C. A. Doh, "Practical Application of MicroLogging in the Northeastern United States," The Oil and Gas Journal, Dec. 14, 1950.

4. M. Martin, "Application of MicroLogging," Drilling, Oct. and Nov. 1950.

BOOKS

GEOLOGY OF SOUTH CENTRAL WYOMING. Guidebook of sixth annual field conference of Wyoming Geological Association. Distributed by Petroleum Information, Inc., Casper. 154 pp. $7.50 (ring-bound $6).

If you are interested in obtaining a complete, up-to-date reference on the geology of South Central Wyoming, this book has the answers. It was compiled as a guide to a 3-day field conference held for the purpose of throwing full light on the deterrents of exploration in this area (anticipated deep drilling depths, and complicated structures masked by unconformities and younger sediments) and to suggest that the search for oil in South Central Wyoming be extended to investigate the possibilities of stratigraphic and fault trap accumulations. This area of Wyoming contains all the ingredients necessary for oil or gas accumulation: favorable stratigraphic section with proved oil-bearing horizons and an abundance and variety of regional and local structure, but few tests have been drilled and comparatively little exploration work done. This guidebook has 16 regional papers, 18 oil-field papers, gas and oil-producing statistics, 14 maps, charts, and photomosaics bound in the book and 6 sheets in the back pocket that include a large-scale geologic map of South Central Wyoming and an electric-log correlation chart. It is bountifully illustrated by photographs, cross-sections, structure maps, correlation charts, and has detailed road logs for about 500 miles of roads, nearly 400 of which were covered by this conference.

INDUSTRIAL PIPING. By Charles T. Littleton, with a special chapter on estimating by R. A. Dickson. Published by McGraw-Hill Book Co., 330 West Forty-Second Street, New York City. 394 pp. $8.

Here is a practical book that brings together in a single volume a vast store of essential information on industrial piping to replace the data sheets, leaflets, catalogs, and standard specifications which practicing pipe designers, pipe foremen, draftsmen, and engineers require in their work. It points out what materials and what kind of pipe and fittings should be used, and where. It provides pertinent data on scores of different materials and types of piping required in the chemical, process, and petroleum industries and power plants, to aid in the choice between one material and another. The chapter on estimating piping costs includes an ingenious quick method of computing variations in costs.

GAS FACTS—A STATISTICAL RECORD OF THE GAS UTILITY INDUSTRY IN 1950. Published by American Gas Association, Bureau of Statistics, 420 Lexington Avenue, New York 17. 363 pp. $1.

This volume represents a part of the A.G.A.'s endeavor to be of maximum usefulness to the industry and to furnish pertinent factual information to other groups interested in the present and prospective status of the gas industry. The association undertook several years ago a review of its then current statistical activities. From this there ensued a substantial revision and expansion of the statistical publications, one aspect of which is indicated by the publication of Gas Facts to supersede the previous annual statistical bulletins. Many tables and charts are used to present facts quickly and readably.

OIL AND GAS FIELDS OF THE TEXAS LOWER GULF COAST. By Frank J. Gardner. Published by Five Star Oil Report, Houston. 240 pp. $25 to subscribers; $50 to nonsubscribers.

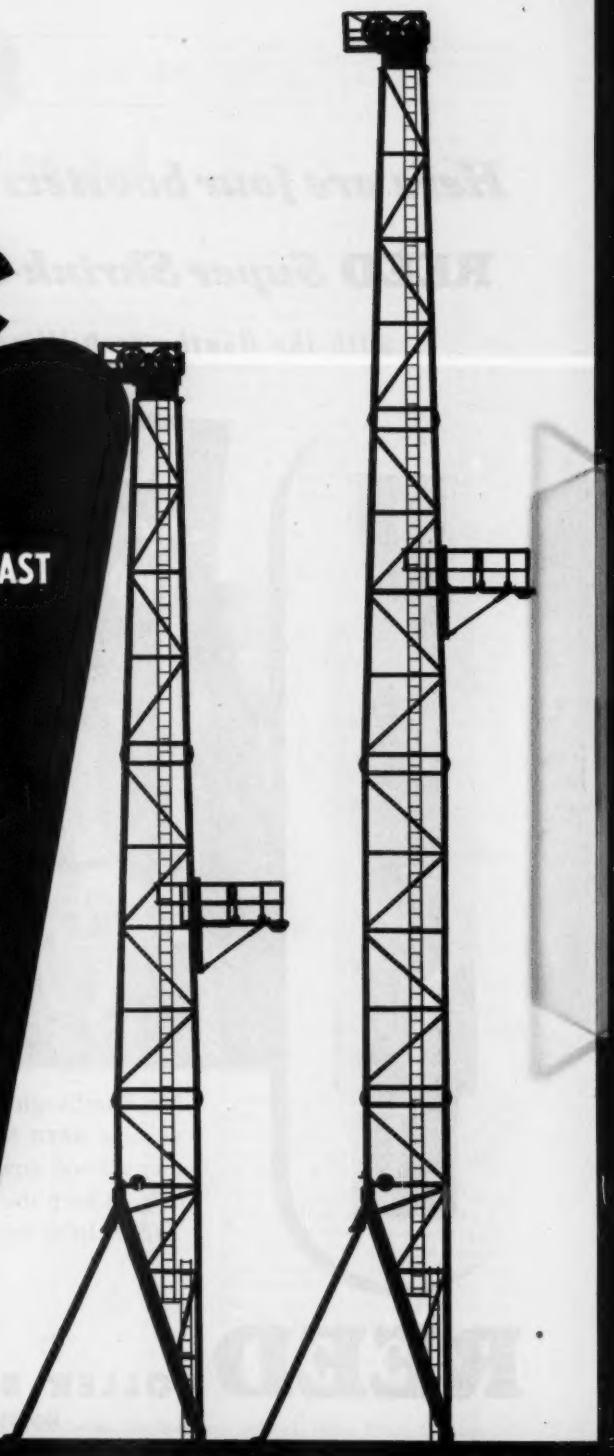
This well-organized volume of oil-field data for Railroad Commission District 2 is the first in a series of 12 volumes designed to record the history and characteristics of the oil and gas fields of Texas, southeastern New Mexico, and coastal Louisiana. In this volume are summaries of development on 350 oil and gas fields arranged alphabetically by field name under the individual county names. Each county is separated by a green page bearing a survey map of that county with all the fields located upon it in detail. The volume also contains many large scale plats of fields and areas. Data contained in the development summaries are, for the most part, as of June 1, 1951; production figures are as of January 1, 1951. Data given in this volume by fields are as follows: Site, means of discovery, discovery well, elevation, deepest well, structural description, productive formations, wells on production, proration rule, potential producing capacity, field daily allowable, principal operators, market outlets, typical formation sequence, and production record.

Moore

TWO SIZES FROM ONE BASIC MAST

Get one 100 foot mast with a 15 foot leg spread. Then, with another small section and a few parts, this mast can be easily converted to 131 feet in height with an 18 foot 6 inch leg spread.

By taking out the section the mast can again be converted to the 100 foot size.



LEE C. MOORE CORPORATION

TULSA • DALLAS • HOUSTON • MIDLAND • SHREVEPORT • WICHITA • CENTRALIA • PITTSBURGH

Export Office — 9 Rockefeller Plaza, New York 20, N. Y.

Fred Rumbaugh
Tool Pusher

William Nelson
Day Driller

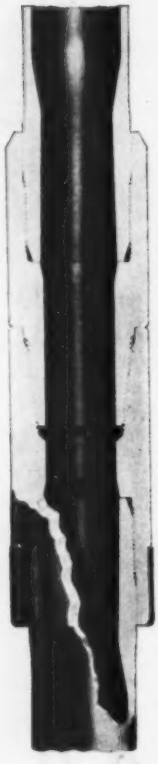
Here are four boosters for

REED *Super Shrink-Grip Tool Joints*

with the Heathman Drilling Co., of Kansas

Earl Saunders

George Starbuck



Mr. Rumbaugh says: "There are lots of reasons why we like **REED** Super Shrink-Grip Tool Joints, but they all boil down to the fact that **REED** Tool Joints help us keep the rig running safely and profitably. They help us do a better job!"

REED ROLLER BIT COMPANY

HOUSTON 1, TEXAS

NEW YORK LONDON BUENOS AIRES

2719

Permeability Distribution and Flood History—1

FOR calculating the history of a flood based on permeability distribution the distribution must itself be known and the dependence of flood advance on permeability must be known. In this discussion the advance in any given bed is assumed to be directly proportional to the permeability as outlined in Engineering Fundamentals No. 467.

The various permeabilities, for sake of simplicity, will be arranged in decreasing order because the highest permeability bed is flooded out first, the next highest second, and so on. Each permeable bed has a thickness denoted as h, with a subscript corresponding to the permeability subscript. There are n separate beds of different permeabilities.

An individual bed, of permeability k_i and thickness h_i, is considered. At that particular time when the flood front in this bed has reached the distance L, the cumulative oil produced can be expressed as the sum of that produced from all beds of permeability greater than k_i and including k_i plus that produced from all beds of permeability less than k_i. All beds are assumed to have the same length, L; porosity, δ; width, W; and per cent of oil saturation removed by the flood, ΔS_o.

The cumulative oil from the group of beds with permeability greater than k_i is $\delta L W \Delta S_o (h_1 + h_2 + h_3 + \ldots h_i)$. The cumulative oil from any bed of lower permeability is $\delta X_i W \Delta S_o h_i$, where X_i is the distance the flood front has traveled in bed i. But X_i is equal to $(k_i/k_i) L$ by the assumption that the flood-front advance is directly proportional to permeability. The cumulative oil from the group of beds of permeability lower than k_i is, therefore, $\delta W \Delta S_o L/k_i (k_{i-1} h_{i-1} + k_{i-2} h_{i-2} + \ldots k_n h_n)$. The total cumulative oil produced at this time is the sum of these two group expressions, or:

$$\text{Cumulative oil} = \delta L W \Delta S_o \left[\sum_1^i h_i + 1/k_i \sum_{i+1}^n k_i h_i\right] \quad (1)$$

Also, just at the time when the flood front reaches the distance L in bed of permeability k_i, the water rate is that given by beds of higher permeability, including k_i, and the oil rate is that given by beds of lower permeability. Since the beds producing water have yielded their burden of oil the rates are as given by Darcy's law for the amount of residual oil present. Thus:

$$\text{Water rate} = \frac{k_w/k\, W \Delta P}{u_w L} \sum_1^i k_i h_i \quad (2)$$

Since the beds of permeability lower than k_i still have a flood front, the rate of flow is given by Darcy's law neither for oil nor water but by a combination, unless the mobility ratio, γ, is unity. Because $\gamma = 1.0$ is the only condition under which the flood advance proportional to permeability holds, it will be assumed also for computing the oil rate. Hence, the total oil rate is:

$$\text{Oil rate} = \frac{k_o/k\, W \Delta P}{\mu_o L} \sum_{i+1}^n k_i h_i \quad (3)$$

The water-oil ratio is therefore given by:

$$\text{W.O.R.} = \frac{k_w \mu_o}{k_o \mu_w} \frac{\sum_1^i k_i h_i}{\sum_{i+1}^n k_i h_i}$$

$$= \frac{\sum_1^i k_i h_i}{\sum_1^n k_i h_i - \sum_1^i k_i h_i} \frac{k_w}{k_o} \frac{\mu_o}{\mu_w} \quad (4)$$

Thus, for a given distribution of permeability, cumulative oil produced versus W.O.R. can be calculated, the former by Equation 1, the latter by Equation 4.

For illustration, a tabulation of permeabilities and thicknesses are given in Table 1. The products $k_i h_i$ are determined and the summations made. Water-oil ratios and corresponding cumulative oil values are calculated, using $\gamma = 1.0$. Results are plotted in Fig. 1. If the mobility ratio, γ, were not zero the water-oil-ratio curve would be that in Fig. 1 multiplied by γ, as stated in Equation 4.

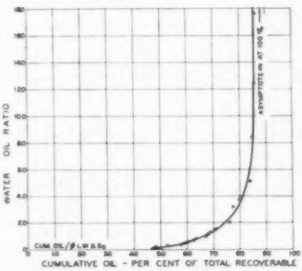
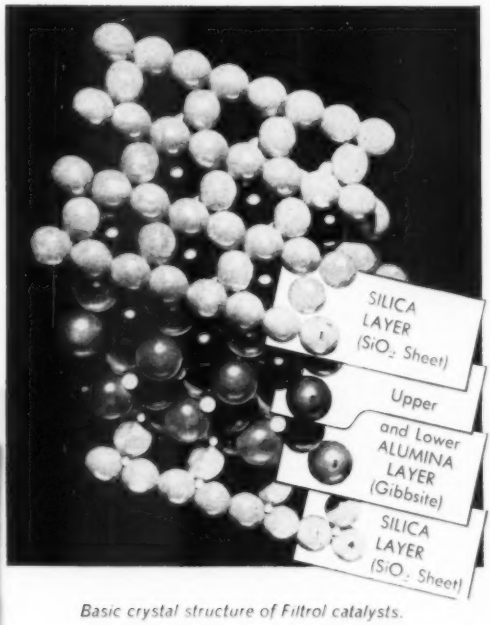


Fig. 1—Water-oil ratio vs. cumulative oil recovery.

TABLE 1—EXAMPLE CALCULATION FOR DEPENDENCE OF FLOOD ADVANCE ON PERMEABILITY

1	2	3	4	5	6	7	$\sum_1^i h_i + \frac{6}{k_i} =$
				$\sum_1^i k_i h_i$	$\sum_1^n k_i h_i - \sum_1^i k_i h_i$	W.O.R. $= 5/6$	Cum. oil $\delta L W \Delta S_o$
k_i	h_i		$k_i h_i$				
158	3.1	3.1	490	490	6,948	.070	47.1
155	3.1	6.2	480	970	6,468	.149	47.9
140	3.1	9.3	434	1,404	6,034	.233	52.4
125	3.1	12.4	388	1,792	5,646	.317	57.6
122	3.1	15.5	378	2,170	5,268	.412	58.7
118	3.2	18.7	378	2,548	4,890	.521	60.1
112	3.1	21.8	347	2,895	4,543	.637	62.4
110	3.1	24.9	341	3,236	4,202	.770	63.1
100	3.1	28.0	310	3,546	3,892	.911	66.9
98	3.2	31.2	314	3,860	3,578	1.08	67.7
96	3.1	34.3	298	4,158	3,280	1.27	68.5
90	3.1	37.4	279	4,437	3,001	1.48	70.7
78	6.3	43.7	492	4,929	2,507	1.96	75.9
75	9.3	53.0	697	5,626	1,812	3.10	77.2
68	3.2	56.2	218	5,844	1,594	3.67	79.6
58	6.2	62.4	360	6,204	1,234	5.03	83.7
55	9.4	71.8	517	6,721	717	9.37	84.8
52	3.1	74.9	161	6,882	556	12.37	85.6
50	3.1	78.1	155	7,037	401	17.55	86.1
42	3.2	81.3	134	7,171	267	26.86	87.7
30	3.1	84.4	93	7,264	174	41.74	90.2
28	3.1	87.5	87	7,351	87	84.49	90.6
12	3.1	90.6	37	7,388	50	147.7	94.8
8	3.2	93.8	26	7,414	24	308.9	96.8
5	3.1	96.9	15	7,429	9	825.4	98.7
3	3.1	100.0	9	7,438	0		100.0
	100.0		7,438				100.0

Series by John C. Calhoun, Jr., Chairman, Petroleum Engineering School, Penn State College



Basic crystal structure of Filtrol catalysts.

Cracking Catalyst Uniformity

NOT THE FRESH BUT THE EQUILIBRIUM CATALYST DOES THE CRACKING AND DETERMINES THE YIELDS AND DISTRIBUTION OF CRACKING PRODUCTS.

ACCUMULATED EXPERIENCE AND DATA SHOW THAT YEAR IN AND YEAR OUT THE STABLE CRYSTAL STRUCTURE AND SIZES OF FILTROL CATALYSTS GIVE UNIFORM DEPENDABLE EQUILIBRIUM CATALYSTS.

OTHER
REASONS FOR USING
FILTROL CATALYSTS

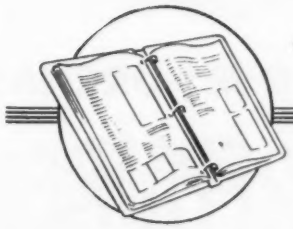
1. HIGHER OCTANE BARRELS
2. HIGH BUTYLENE YIELD
3. LOW COST
4. SULPHUR RESISTANT CATALYSTS
5. FASTER REGENERATION RATE
6. VARIED PLANT FACILITIES
7. TECHNICAL SERVICE
8. LOWERED EXCESS BUTANE
9. LOW ATTRITION RATE

FILTROL CORPORATION

OFFICES: 727 WEST SEVENTH ST., LOS ANGELES 17, CALIFORNIA
PLANTS: VERNON, CALIF.; SALT LAKE CITY, UTAH; JACKSON, MISS.

Filtrol

CATALYSTS AND ADSORBENTS



THE REFINER'S notebook

No. 100

Calibration and Startup in Instrument Installation

by H. A. Hulsberg*

IN preceding installments various steps in instrument installation were discussed, beginning with receipt and storage of instruments and continuing through connection and checking of flow and pressure instruments. In this concluding installment of the series on instrument installation, check of pyrometer and controller operation, other final checks and the start-up procedure are outlined.

Checking Pyrometer and Controller Operation

Electrical temperature instruments are checked against portable instruments, and the calibration is adjusted where required. Needless to say, the accuracy of the portable instruments and the checking procedure should be unquestionable before factory calibrations are changed. A good procedure is to check the instrument at the control board with the regular lead wire disconnected, and then to recheck the calibration by connecting the portable instrument at the field termination of the lead wire. A difference in calibration will often uncover such troubles as reversed leads at splices, improper lead-wire materials, or insulation failure.

The direction of operation of controllers should be carefully checked against the specifications to see that, for instance, a rise in temperature will cause a control valve to close, where closing will tend to reduce the temperature. Reversed operation of instruments is very confusing to operators, so that serious consequences could result before the reversal is discovered.

*Head of instrument engineering and service, Universal Oil Products Co. Paper presented at I.S.A. meeting, Houston, 1951

At the same time that the direction of operation of instrument is checked, the valve or other operator may be put through its paces to check for sticking, improperly adjusted positioners, and to see that the controller is working the right valve. Also at this time controller adjustment may be tested to see that throttling and reset are functioning as intended. The controller may then be set at an estimated throttling range or reset rate. These adjustments will be corrected later during the startup if it is found necessary.

As each instrument is checked through from plant to control board, it should be marked with a tag or label to indicate that it has received attention. The instrument man doing the testing should initial the testing record. This will tend to make for more careful attention, and make omissions less likely. Nameplates may be checked for proper labeling of instruments at this time, and meter factors should be put on flow meters for the convenience of plant operators, if they are not already a part of the nameplate.

Preparatory to startup, chart clocks should be started, pens inked, air and electricity cut in, meters should be sealed and balanced, and potentiometers or other electrical instruments balanced where required.

Startup Stage

After pumps have been run in, valves should be opened to clean out rocks, welding slag, scale, and dirt where valve action indicates this is necessary. Any temporary screens used to protect flow elements, valves, or pumps should be removed after a proper period of operation.

The startup stage is a hectic period which may be made considerably easier if representatives of the various instrument companies can be present to give advice and help. Their activities should be coordinated with those of the plant instrument department, the installation instrument engineer, and the plant operating personnel to avoid confusion.

Each person's responsibility must be clearly understood. For instance, one will be responsible for cutting in service liquid-level controllers and valves, one will give meters attention, etc. In the interests of safety and good relations the operator in charge of the plant should be consulted when any change is made, or when an instrument is to be cut in or out of service for repair or adjustment.

When the plant or a particular part of a plant has lined out sufficiently, the throttling, reset, or derivative adjustments are dressed up to eliminate cycling, drift, or instability of controllers.

The startup period is the eventual showup of errors in engineering, drafting, and construction. The field instrument engineer can perform a valuable service if he writes a report of troubles encountered, and how he thinks they can be avoided in future installations. The manufacturer should be advised of any difficulties encountered with his instruments, and of any suggestions for improvement of the instrument to correct the difficulty.

All suggestions should be made in the spirit of constructive criticism to correct future difficulties, and should be done in a diplomatic way to avoid unnecessarily injured feelings.

You should apply this rule

TO EVERY ROTARY HOSE PURCHASE:

CAN IT BE REPAIRED?

COUPLING:
The Barney Coupling is the only coupling that is stronger than the hose itself.

CORD CONSTRUCTION:
Goodall's flexible cord design eliminates the cause of more than 90% of rotary hose failures.

FLEXIBILITY:
Goodall Long-Life can be coiled or twisted without damage.

PERFECT BALANCE:
The Goodall method of winding the multiple cords of the carcass and the steel cables of the pressure element at corresponding angles assures perfect balance.

GREATER STRENGTH:
By actual test, Goodall is the strongest hose ever built . . . retains its strength better.

REPAIR SERVICE:
Goodall Rubber Company is the only rotary hose manufacturer that can protect your investment with a maintenance plan.

SALVAGE VALUE:
Substantial allowances are made on every set of Barney Couplings returned.

NO PREMIUM PRICE:
The extra value, long life and high salvage value of Goodall Long Life costs no more than ordinary rotary hose.

What rule do you apply to your rotary hose purchases? Do you consider price first? Strength? Flexibility? Long life?

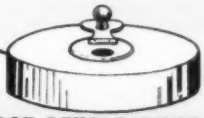
If any or all of these features must be met by the rotary hose you buy, then Goodall Long-Life Rotary Hose is your logical first choice! But more than that . . . because Goodall Rubber Company is the only rotary hose manufacturer that can protect your investment with a maintenance plan. This means that . . . instead of being scrapped the first time it meets with an accident . . . your Goodall Long-Life rotary hose can be repaired to give good-as-new service for the rest of its normal life.

That's why we say to all rotary hose buyers: Apply this rule to every rotary hose purchase: Can it be repaired? Goodall Long-Life can be!

GOODALL RUBBER COMPANY
TRENTON, N. J.

GOODALL RUBBER COMPANY OF TEXAS: Houston, Texas.
GOODALL RUBBER COMPANY OF CALIFORNIA: San Francisco, Los Angeles, Seattle, Salt Lake City, Portland.
GOODALL RUBBER COMPANY: New York, Philadelphia, Pittsburgh, Chicago, Denver, St. Paul, Detroit.
EXPORT: Goodall Rubber Company, Trenton, N. J.
DISTRIBUTORS: Texas and Louisiana — Houston Oil Field Material Co.; Wilson Supply Co.
Oklahoma — Iverson Supply Co.

Attention Goodall Rotary Hose owners: NEVER DISCARD A GOODALL ROTARY HOSE UNTIL YOU CONTACT US.



GOODALL HAS BEEN FIRST WITH EVERY WORTHWHILE ROTARY HOSE DEVELOPMENT

OIL AND GAS EQUIPMENT Digest

IT'S NEW — CHECK IT

TRADE LITERATURE

1 SILENT CHECK VALVES which are designed to prevent water hammer, are described and illustrated in a four-page bulletin. These valves not only eliminate the noises, but also prevent the pressure surges which can result in damage to pipes, valves, liquids, and other parts of piping systems. *The Williams Gauge Co.*

2 FOR OIL AND ALLIED INDUSTRIES. A map of the oil and gas areas of Canada is included in this folder of useful facts regarding Canada. The map shows refineries and their capacities, oil and gas pipe lines, proposed pipe lines, and oil and gas fields. The book contains information on foreign exchange, income taxation, types of incorporation, leases and reservations, conservation legislation, customs regulations, immigration, and a synopsis of the development of the industry in Canada. *The Canadian Bank of Commerce.*

3 ROTARY DISPLACEMENT METERS. In general these meters are ideal for measuring large volumes of gas requiring a 3-in. or larger connection. Schematic diagrams and photographs together with text material, charts, and graphs, cover performance, capacities, sizes, and test information. Capacities range from 4,000 to 1,003,000 cu. ft. per hour. *Roots-Connersville Blower Corp.*

4 PARANCOR describes anticorrosives and protective coatings for metals. These coatings are permanently plastic and move with the metal surface under temperature changes. They are resistant to electricity and offer protection against electrolysis corrosion. *Pipeline Protection Co.*

5 LUBRICATED PLUG VALVES. Illustrations, cutaway drawings, and data tables cover a complete range of lubricated plug valves for pipe lines, christmas trees, refineries, and field-processing plants. *American Car & Foundry Co.*

6 VANE-TYPE ROTARY PUMP. Bulletin W-485-B1 pictures and describes six models in eight sizes, which include pipe openings from 2 to 12 suction inches, and 2 to 12 discharge inches. Range of nominal ratings includes capacities from 25 to 1,000 g.p.m. and speeds from 850 to 210 r.p.m. Dimensions, nominal ratings, and line drawings are also included. *Worthington Pump & Machinery Corp.*

7 MOTOR-DRIVEN CONTROLLED-VOLUME PUMPS is a 24-page, 2-color, illustrated bulletin explaining how these units are used to pump practically any liquid, from heavy viscous liquids to light solvents, solids in suspension, abrasive slurries, hot or cold liquids, liquefied gases, and other materials. It also includes details on how pump capacity can be regulated by plunger speed and stroke adjustments. *Milton Roy Co.*

8 PRODUCT-DESIGN CATALOG covers 16 pages of complete description and specifications on many products for original equipment manufacturers' use. Information on metallic bellows of stainless steel, brass, bronze, and other alloys is included, with complete specifications. Also included is complete in-

FOR MORE INFORMATION . . . . use one of these cards

Postage Will Be Paid by Addressee

No Postage Stamp Necessary if Mailed in United States

BUSINESS REPLY CARD

Permit No. 3A, 34.9 P. L. & R., Tulsa, Oklahoma

THE OIL AND GAS JOURNAL
BOX 1260
TULSA, OKLAHOMA

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20)
(21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40)
(41) (42) (43) (44) (45) (46) (47) (48) (49) (50)

For further information—without obligation—I have checked numbered circles above

Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Dec. 6, 1951

PLEASE PRINT

COMPANY NAME .....

STREET ADDRESS .....

CITY ..... ZONE NO. ..... STATE .....

NAME ..... TITLE .....

formation on types of flexible metal hose and tubing, flanges, couplings, and fittings. *Chicago Metal Hose Corp.*

9 EQUIVALENT VALVES MANUAL, 170 pages, loose-leaf, is illustrated by multicolored sheets, and compares valves of 18 leading manufacturers by material, type, pressure rating, and structural variations. It also covers over 50,000 postings of figures, names and descriptions. *Equivalent Valves Co.*

10 BOILER SERVICE VALVES is a 21-page bulletin describing quick-opening and slow-opening straightway valves, angle and "Y" valves, and duplex blowoff units, with complete specifications, materials of construction, and dimensions of each type. Illustrations include details of design, sectional and "exploded" views, and explanations of operation of the valves. *Everlasting Valve Co.*

11 TUBE FITTINGS. Catalog B-151 describes and illustrates the complete line of leakproof tube fittings which are available in brass, aluminum, steel, stainless steel, and monel. Complete dimensional information, cross-section drawings, installation recommendations, and assembly instructions are included. *Crawford Fitting Co.*

12 STEAM-TURBINE GENERATOR UNITS, manufactured in N.E.M.A. ratings of 2,000 to 7,500 kw. are described in an eight-page brochure. Cross-section views of each of the turbine types are shown as well as cross sections of the steam-turbine generator unit. *Allis-Chalmers Manufacturing Co.*

13 RECORDING INSTRUMENTS. An eight-page multicolored bulletin gives descriptive information and dial ranges on recording and dial-indicating thermometers, and recording gages. Standard scale and chart ranges with a complete price list are also included. *Electric Auto-Lite Co.*

14 HEAT PROCESSING. Bulletin S-7.1 approaches heat processing through five basic questions: what is to be heated, what sections are to be heated, why the material is to be heated, to what temperature or temperatures, and the heating time. It illustrates application of high-production heating principles to solid and fluid products ranging in size from mill operations to delicate enameled pieces. *Selas Corp. of America.*

15 RUBBER-SHEET PACKINGS are featured in an eight-page attractively printed bulletin, which also includes illustrations, and descriptions of pure-gum floating stock, Neoprene, red rubber, pure-gum stock, black-oil resistant, cloth-inserted, and diaphragm-sheet packings. *Raybestos-Manhattan, Inc.*

16 THERMOMETERS. New four-page specification sheet describes indicating and recording thermometers. Construction and engineering details are included. *Minneapolis-Honeywell Regulator Co.*

17 APPARATUS CATALOG 20-C presents complete information on welding and cutting equipment through carefully planned illustrations and charts for easy selection and ordering. *Victor Equipment Co.*

18 HARDFACING ROD-SELECTION GUIDE for Amscoating with Amsco hardfacing products is a chart which breaks down into basic operations the parts that can and should be hardfaced for longer life. The guide gives the name of the part, recommended rod, sizes, and method of application. *American Manganese Steel Division.*

19 RENTAL-TOOL CATALOG covers description and prices of all types of oil-field equipment available for rent. Charts are included on sizes and dimensions. *George Rental Service Co.*

20 BULLETIN 1025A describes the use of the Utiliscope (wired television) camera which provides a clear, instantaneous reproduction, at a distance, of any operation, scene, or demonstration. It can be used to improve product quality, save manpower, prevent accidents, or as an aid to increased production. Bulletin illustrates the camera as used in various industries. *Diamond Power Specialty Corp.*

21 FLUID-DRIVEN POWER UNITS for drilling operations are explained and illustrated in a six-page multicolored brochure. It also includes a diagrammatic cross-section showing fluid-drive operation. *American Blower Corp.*

22 P-A GAS SCRUBBERS is a data sheet describing the cyclonic and venturi gas scrubber, and a combination venturi-cyclonic scrubber. *Power-Gas Corp., Ltd.*

FOR MORE INFORMATION . . . . use one of these cards

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20)
(21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40)
(41) (42) (43) (44) (45) (46) (47) (48) (49) (50)

For further information—without obligation—I have checked numbered circles above

Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Dec. 6, 1951

PLEASE PRINT

COMPANY NAME .....

STREET ADDRESS .....

CITY ..... ZONE NO. ..... STATE .....

NAME ..... TITLE .....

Postage Will Be Paid by Addressee

No Postage Stamp Necessary if Mailed in United States

BUSINESS REPLY CARD

Permit No. 3A, 34.9 P. L. & R., Tulsa, Oklahoma

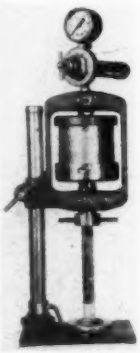
THE OIL AND GAS JOURNAL
BOX 1260
TULSA, OKLAHOMA

OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

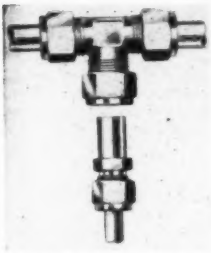
by Dan B. Miller

23 OBI FILTER PRESS. Chief advantage lies in its ability to measure accurately low-filture-loss drilling fluids. The bottom cell is so constructed that the small holdup volume (0.08 ± 0.03 cc.) is almost negligible. However, should present methods of evaluation be desired, the OBI Filter Press can be converted by simply inserting a Monel screen into the bottom cap. Holdup volume with screen in place approximates 1.0 cc. The new press is compact; easy to operate; and requires no wrenches, pliers, or special tools to assemble; easy to clean; is equipped with special long-lasting, built-in oil resistant gaskets; and is more accurate than any other filter press in use today. A short test when multiplied by a factor gives a highly accurate reading for 30 minutes. A wooden carrying case holds the instrument and complete equipment for field tests. Ganged assemblies of testers can be supplied for laboratory use. *Oil Base, Inc.*



IT'S NEW CHECK IT

24 NEW SWAGELOK REDUCER FITTING is designed to permit different sizes of tubing to be joined easily. It consists of a body, two ferrules, and a nut. The two ferrules, plus the threaded chuck inside the Swagelok nut, clinch tight around the tubing wall and provide a leak-proof seal. Illustration shows a ½-in. Swagelok tee and a ⅜-in. Swagelok reducer. It is not necessary to perform any preparatory steps on the tubing. Simply insert the tubing into the reducer, apply one and one-quarter turns to reducer nut, and the first assembly is completed. Now insert the reducer into the Swagelok fitting and apply one and one-quarter turns to the fitting nut. Now the whole assembly is completed, torque-free and leak-proof. In this manner instrumentation and process-piping lines may be reduced to the required diameter. Reducer fittings are available in brass, aluminum, steel, stainless steel, and Monel with sizes ranging from ⅛ to ⅞-in. o.d. *Crawford Fitting Co.*



IT'S NEW CHECK IT

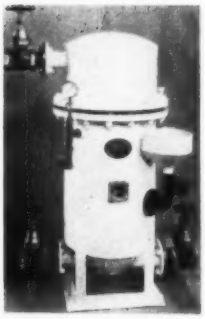
25 HOLD TITE SAFETY CLAMP safeguards the fingers of the pumper when changing stuffing-box rubbers. This clamp, which weighs 7 oz., is carried by the pumper with his new stuffing-box rubbers. Whenever it is necessary to replace worn-out rubbers, the top of the stuffing box is unbolted or unscrewed, and the top raised up on the polish rod. The clamp is then easily inserted with one hand. Made of spring steel, there is virtually no wear-out to this device, and the saving in lost time and expense from hand injuries will pay for many of them. *Meynig Brothers.*

IT'S NEW CHECK IT

26 THE STELLAR FILTER. Filtering through a shallow bed of kieselguhr powder or diatomaceous earth at rapid rates, it is small and light. Since no coagulant is required, it affects a considerable saving in the cost of operation and can be used for filtering liquids where the addition of chemicals is not permitted. The filter consists of a specially constructed element formed by a wire wound in a screw thread over a rigid foundation. This forms an unchokable strainer on which the filter bed of kieselguhr powder is deposited. Filtration may be of any desired degree of fineness, depending only upon the grade of material used for the filter bed. An observation port is provided, so that the formation of the filter bed on the elements may be observed. For liquids other than water, suitable metals or construction.

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.



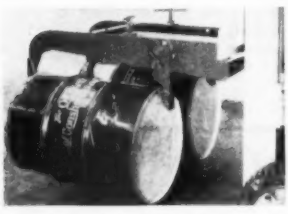
such as stainless-steel elements, shells, fittings, and valves, are provided. *Paterson Engineering Co., Ltd.*

IT'S NEW CHECK IT

27 TUBE-TURN SF (Scale-Free) WELDING COUPLING consists of two forged halves, as illustrated in the accompanying photograph. The ends of the hubs are prepared for welding to pipe or welding fittings of corresponding sizes. When the two halves of the coupling are brought together, the tongue of one slips into the groove of the other. A circumferential cavity directly beneath the beveled welding area prevents burn-through or the formation of icicles in the interior. The cavity also insulates the interior from the extreme welding heat and prevents scaling. It is useful in connecting piping designed to carry hydraulic fluids, high-pressure steam, compressed air, certain chemicals and gases, lubricating oil, and fuel oil. It is available in sizes from 1¼ through 12-in. and in carbon steel, stainless steel, aluminum, and other metals and alloys. *Tube Turns, Inc.*

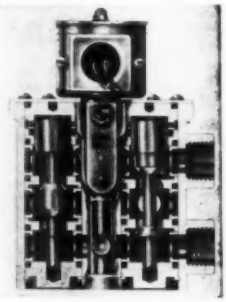
IT'S NEW CHECK IT

28 NEW HORIZONTAL DRUM HANDLING DEVICE can be attached to any industrial fork truck without removing the forks or making any hydraulic or mechanical connections. Completely automatic, the device is a self-contained unit that fits over the forks and is fixed to them with two screw-type clamps. One or two standard drums can be picked up by simply lowering it over them while the truck is slowly backing away. The rear clamps are spring loaded and snap under the lip of the drum. When the drums are lifted, gravity action locks the clamping hooks in place. There is no load on the springs at any time. Drums are lowered, the truck is moved forward, and as soon as the forward clamps are free, the channels on the truck are tilted back. The truck is then backed away to free rear clamps. *Yale & Towne Manufacturing Co.*



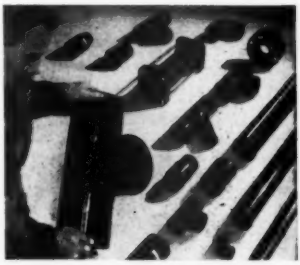
IT'S NEW CHECK IT

29 NEW CRESCENT 4-WAY VALVES. A performance characteristic is continuous fast cycling, up to 600 cycles per minute, without overheating. Production-line valves have registered over 40,000,000 cycles on test. Valves come in ¼, ⅜, ½, and ¾-in. sizes for single and dual-pressure operation on air, water, or light oil from 0 to 150 psi. Solenoids available for all standard voltages, a.c. and d.c. Solenoids and pilot-valve parts are the same for all sizes to simplify maintenance. *Barksdale Valves.*



IT'S NEW CHECK IT

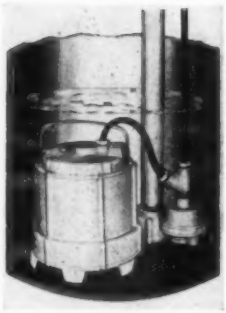
30 NONCORRODIBLE PIPE FITTINGS for oil-field use are fabricated from durable Tenite plastic, the same tough material now widely used for oil-field piping. Threaded or slip-sleeve, the fittings are produced in a great variety of sizes and shapes. Slip-sleeve couplings can be quickly installed, permanently bonded in Tenite lines by use of a cement and thinner having an affinity for plastic. The light weight and high-impact strength of Tenite make the fittings easy and advantageous to handle. Tenite parts prove exceptionally resistant to weather and soil conditions. *Green Contracting & Engineering Co.*



IT'S NEW CHECK IT

31 UTILITY PUMP. A completely submersible utility pump has many industrial applications. Principal uses include sumps in plant layouts such as in pits, underground utility installations, and other low areas; draining flooded ditches, and draining tanks and vats. The submersible feature is made possible by the automatic liquid-level control switch which eliminates the need for a float. This switch turns the pump on automatically as a result of air pressure created by water rising in the switch skirt thereby moving a diaphragm which in turn trips the switch. The low turn-off point is obtained since pumping action sustains switch operation and makes it possible to pump a sump dry within ⅜ in. of the bottom. It weighs only 50 lb. and can be

Workin' Overtime
. . . to give you a superior oil field supply service!
Courtesy
Service
Dependability
AND Manufacturing COMPANY
TULSA, OKLAHOMA
Stores in Kansas, Oklahoma, Texas, Louisiana, and New Mexico



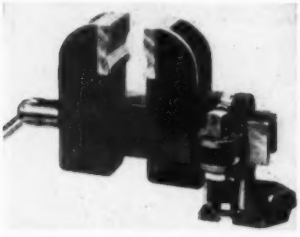
moved and placed in operation very quickly. It is compact, measuring 9½ in. high and a maximum diameter of 13 in. It has a capacity of 3,300 g.p.h. *Kenco, Inc.*

IT'S NEW CHECK IT

32 "KEY-KAST" ALLOY STEEL WELDING PIPE FITTINGS AND FLANGES. Based on a design of great wall thickness throughout and added thickness at areas of stress, the line provides a strong fitting and gives long life to piping systems at a low unit cost. The new line meets A.S.A., A.S.-M.E., and A.S.T.M. standards. It is available in low and intermediate alloys and various types of stainless steel. A boss is provided on all fittings for tapped openings. The line is available in all sizes and schedule numbers. *Key Co.*

IT'S NEW CHECK IT

33 MULTI-VISE is all steel, yet weighs only 28 lb. It is easily carried from one job to another. Available in three models, this precision construction vise has a 360° vertical swivel, a horizontal swivel, or a double swivel with both horizontal and vertical swivels. The outstanding feature of this vise is the fact that the vise is easily removed from the bench plate. The vise has removable, replaceable, reversible jaws. Jaw capacity is 6 in. square and 5¾ in. round. *American Implement Co.*

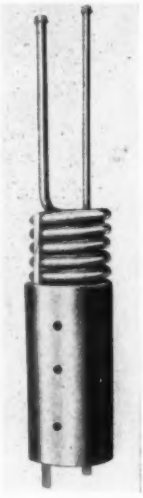


IT'S NEW CHECK IT

34 PRECO BACK-RIPPERS mounted on the back of bulldozer moldboards rips only when the tractor backs up. The four back ripper housings are welded to the under side of the "C" frame on angling blade bulldozers, permitting their use irrespective of the angle of the blade itself. The teeth float on top of the ground when the tractor moves forward, and automatically dig and rip when the tractor backs up. Thus the dead-head back-up time becomes a profitable operation and enables the blade to make a full load on each forward trip. When desired, the teeth can be locked up out of the way. *Preco, Inc.*

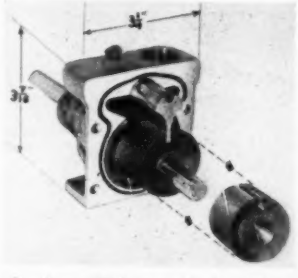
IT'S NEW CHECK IT

35 BULK STORAGE-TANK PREHEATER. A new preheater for 14½-in. manholes of bulk-storage tanks has an all-steel shell and coil assembly that is inserted into a storage tank for preheating oil and other liquids. It rests on the bottom of the tank. Suction pipe and inlet and outlet pipes for heat, either steam or hot water, go through the manhole cover. A special flow accumulator causes the heavy oils or other liquids to flow over heated pipes before entering the suction line. In this way liquids are heated to proper flow temperature. Load is taken off the suction pump. Proper length inlet and outlet pipes to fit any diameter tank are furnished. *Rempe Co.*



IT'S NEW CHECK IT

36 ALLCHEM, a new line of chemical process pumps has as standard equipment, Teflon impellers, a Teflon packed stuffing box and a choice of Teflon or Graphitar self-lubricating bearings. Manufactured with stainless-steel pump casings and shafts, this compact pump is used for small-volume process or laboratory work and finds wide usage in transfer applications, to pilot-plant and industrial applications. Will operate in either direction in capacities from 1 to 20 g.p.m. and pressures up to 40 psi. with excellent lift. Capacities subject to viscosity, temperature, and specific gravity. *Eco Engineering Co.*



NATURAL GAS

OPS Eyes Prices

Area-pricing plan for dry gas at well head readied

WASHINGTON.—An "area pricing" formula for the setting of ceilings for dry gas at the well head in new fields is being readied by the Office of Price Stabilization.

The OPS plan was outlined to representatives of the industry at a meeting at which it was reported that 16 applications have been received for price ceilings on new offerings of gas representing, in general, the same type gas in the same general area and subject to the same marketing conditions.

A majority of the industry representatives present were said by OPS to have agreed on the feasibility of an area pricing plan, and suggested that North and South Louisiana, East Texas, the Gulf Coast and South Mississippi be considered as a single area for the purpose of studying prices on new gas and that the Permian Basin in West Texas be considered as a separate area.

Industry representatives pressed upon OPS officials the necessity for providing adequate ceiling prices, pointing out that transportation and development costs make it impractical to develop and market available gas in some areas. An attractive price for new gas is imperative if supplies are to be increased, they insisted.

Orville D. Judd, chief of the OPS petroleum branch, who presided at the meeting told the industry the agency would approach the new-gas problem at the dry gas level and at a later date would consider residual gas as a separate factor.

Texas Markets 307,117,081 M.c.f. of Gas in September

AUSTIN.—Marketed production of natural gas in Texas during September (307,117,081 M.c.f.) dropped off about 14,000,000 M.c.f. from the total produced in August but was almost 20 per cent higher than that produced in September 1950.

In its monthly report, the Texas Railroad Commission said total gas produced was 378,458,693, up almost 14 per cent from the same month last year but down about 16,000,000 M.c.f. from August.

Transmission lines took 58.35 per cent of the total, with 37.55 per cent of the take exported from the state.

Gas vented, including line losses, dropped sharply to 4,015,840 M.c.f. from the August figure of more than 5 billion cubic feet. The high losses in August were laid to higher allowables set by the commission in response to the federal Government's call for increased production due to the Iranian shutdown. Gasoline plants and gathering lines were unable to take care of the accompanying boost in gas production.

Other classifications of gas disposition held relatively steady with only slight decreases from August figures. Breakdown is shown in accompanying table.

Natural Gasoline

Stanolind Plans West Texas Propane-Storage Reservoir

AUSTIN.—Stanolind Oil & Gas Co. is planning construction of an underground-storage reservoir for propane near its gasoline plant in North Cowden field, Ector County, Texas.

In a hearing recently before the Texas Railroad Commission, company spokesmen said that a cavity is to be created in a salt section from 1,950-2,750 ft.

Stanolind asked permission to drill two wells—one to the salt section to create a cavity and the other to the Santa Rosa formation for storage of salt water until it is needed for reuse in the storage program.

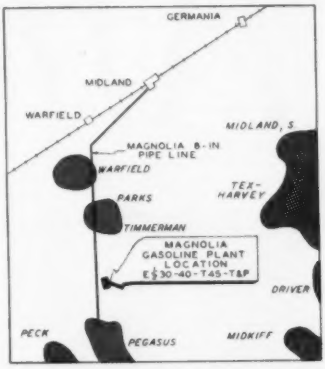
The reservoir would have an initial capacity of 50,000 bbl. It would be enlarged later if conditions should warrant. Fresh water would be used as the displacing agent for propane as needed until the cavity should be enlarged to maximum capacity. Salt water from the Santa Rosa storage well would then be used.

Location is in 34-1n, Block 43, T&P-RR Survey.

ULTIMATE DISPOSITION OF ALL GAS PRODUCED IN TEXAS
(Source: Texas Railroad Commission)

	M.c.f.	Per cent of total	Per cent of increase over Sept. 1950
Extraction loss—plants*	13,509,820	3.57	18.62
Plant fuel and lease use	28,424,073	7.51	6.32
Gas lift	14,294,648	3.78	14.45
Pressure maintenance and repressuring	25,659,072	6.78	—10.77
Transmission lines	220,828,396	58.35	24.77
Cycled	45,682,540	12.07	—2.76
Carbon black	26,044,304	6.88	.36
Vented and line loss	4,015,840	1.06	39.29
Total	378,458,693	.....	13.94
Net total for market	307,117,081	.....	19.77

*Extraction loss is shrinkage in gas volume due to removal of liquefiable hydrocarbons.



Magnolia Awards Contract For Pegasus Field Plant

DALLAS.—Magnolia Petroleum Co. has awarded contract to Hudson Engineering Corp., of Houston, for construction of a gasoline plant to serve Pegasus field of Midland and Upton counties in West Texas *(The Oil and Gas Journal, November 8, page 343)*.

Construction will begin in December. The plant will have an initial capacity of 30,000,000 cu. ft. of casinghead gas per day and will produce about 100,000 gal. of natural gasoline, butane, and propane per day.

Plans call for an absorption-type plant with an amine gas-sweetening process and a triethylene glycol dehydration system. Gas will be compressed for delivery to El Paso Natural Gas Co., which has advised that its pipe line to the field will be completed in February 1952.

Exact location is in the east half of Section 30, Block 40, Township 4, south of Texas & Pacific Railway Co. Survey in Midland County, approximately 30 miles southwest of Midland.

Products will be carried to Warfield, Tex., about 20 miles north of the plant by products line. They will be shipped by rail from Warfield.

R. D. Hanley, vice president and manager of Magnolia's natural-gas department, said the plant is being so designed that it can be expanded easily to serve further Pegasus development. Limits of the field have not yet been fully defined.

Process facilities, compressor station, storage, and about 32 miles of gathering lines will cost an estimated $8,400,000. The extraction plant should be ready for operation by January 1, 1953, Hanley said.

Knock

CORROSION COSTS IN THE HEAD

with

Uniform Quality

DOWELL

MAGNESIUM ANODES

Dowell Magnesium Anodes have *uniform quality!* Extensive research has shown that the effectiveness of magnesium anodes varies with changes in the alloy composition. With controlled uniform quality, Dowell offers magnesium anodes of consistently long life and high efficiency.

More than ten years ago, The Dow Chemical Company pioneered the use of low-cost, expendable magnesium anodes for the control of corrosion on pipelines, tanks and other underground and underwater metal structures. Today, with Dowell anodes, you receive the direct benefit of the years of research in Dow laboratories, extensive field testing and actual usage in many areas.

Dowell offers a variety of sizes of magnesium anodes designed to meet different industrial applications. A nation-wide network of offices backed by complete research facilities are ready to help you in your cathodic protection planning. For prompt advice, call the nearest Dowell office or write direct to Tulsa. Ask for the free booklet, "Dowell Magnesium Anodes" or other literature on specific applications.

DOWELL INCORPORATED • TULSA 3, OKLAHOMA
OFFICES IN PRINCIPAL CITIES

DOWELL

MAGNESIUM ANODES

GALVO-PAK® • GALVO-LINE

SUBSIDIARY OF THE DOW CHEMICAL COMPANY

Look to **DOWELL**

MAGNESIUM ANODES FOR CORROSION CONTROL

PIPE LINES

Big Line Operating

Texas-Illinois winds up testing of entire system

CHICAGO. — Texas-Illinois Natural Gas Pipeline Co.'s big $135,000,000 natural-gas transmission line from the Texas Gulf Coast to Joilet, Ill., was placed in operation this week.

Joseph J. Hedrick, company president, said the last link in the 1,417-mile 30-in. high-pressure line, the submarine crossing of the Mississippi at Grand Tower, Ill., was welded and tested last week. Final testing of the entire system was scheduled to be concluded this week.

Ground-breaking ceremonies for the line were held about 15 months ago at Wharton, Tex. Initially, the line will carry about 374,000,000 cu. ft. of gas daily from Gulf Coast fields in a north-northeast direction to the Chicago area. It crosses Arkansas via Texarkana and Little Rock, cuts through southeastern Missouri, and submarines the Mississippi about 30 miles north of Cape Girardeau, Mo.

Increase scheduled. — Ultimately, capacity of the big carrier will reach 524,000,000 cu. ft. daily. This will augment supplies of about 510,000,000 cu. ft. per day carried by two dual lines of Natural Gas Pipeline Co. of America. Both companies are subsidiaries of Peoples Gas Light & Coke Co., Chicago.

The Texas-Illinois line has its southernmost supply source near the Rio Grande at Falfurrias, Tex. It is the third long-distance pipe line linking the Chicago area and intermediate markets with the Southwest.

Dedication ceremonies were scheduled to take place at the line's main terminal 4 miles west of Joliet this week, Hedrick said. This terminal is the connecting point with lines of Chicago District Pipeline Co., which transmits gas to Chicago region utilities.

Service's Missouri Crude Lines Nearing Completion

LAPLATA, Mo. — Construction of about 30 miles of 20-in. crude-oil loops on Service Pipe Line Co.'s multiline system across Missouri will be completed soon.

The new loops will enable the company to increase crude deliveries in the St. Louis and Chicago areas by about 17,000 bbl. daily.

The project includes construction of 12.8 miles of line in Macon County from Service's LaPlata station to a point west of the Chariton River and 16.8 miles of 20-in. from Odessa Junction in Lafayette County through Johnson and Jackson counties to Pleasant Hill Junction in Cass County. Both lines will parallel existing carriers. G. G. Griffis Construction Co., Inc., Tulsa, started work late in October.

Another Service line scheduled for completion soon is a 19-mile, 16-in. section from Raytown, Mo., to Standard Oil Co. (Ind.) Sugar Creek, Mo., refinery. The new line will be capable of delivering about 68,000 bbl. per day to the refinery.

Construction, started early in October, is under contract to Sheehan Pipe Line Construction Co., Tulsa.

United Expanding

Work pushed on 1,200 miles of new gas lines

SHREVEPORT. — United Gas Pipe Line Co. is pushing a three-pronged construction program totaling more than 1,200 miles in Texas, Louisiana, and Mississippi.

In the Houston-Beaumont-Orange, Tex., area, United has let contracts for construction of 93.6 miles of 20, 24, and 26-in. transmission lines to River Construction Co.

River also has contract for laying 86.1 miles of 30-in. from Tom O'Connor field in Refugio County to a point in Wharton County, Texas. Construction includes a multiple crossing of the Guadalupe River consisting of three 20-in. submarine lines.

Biggest contract. — Construction aggregating 1,032 miles of 8 to 30-in. lines scattered throughout the three-state area has been authorized in Federal Power Commission Dockets G-1447 and G-1574. Engineering work is being handled by Brown & Root, Inc., in addition to construction of compressor stations and dehydration plants.

Pipe-line construction, not including suspension river crossings, has been contracted by Gulf-Southern Contractors. The contract is reported to be the largest single pipe-laying contract in the United States. Contracts for construction of suspension-bridges over the Colorado, Brazos, and Red rivers has been let to Pittsburgh-Des Moines Steel Co.

This program includes a 28-mile, 20 and 14-in. offshore line completed by United recently which ties in Eugene Island gas reserves off the coast of Louisiana with the company's system.

Six spreads are in the field on the company's second and third programs. Four belonging to River Construction, two to Oklahoma Contracting Co.

Now completed.—In the last 4 months,

PERRAULT

★ PIPE COATING AND WRAPPING MACHINES LINE TRAVELING AND STATIONARY

★ PIPE CLEANING AND PRIMING MACHINES

★ TAR HEATING KETTLES

★ BENDING MACHINES

★ PIPE CRADLES

★ PIPELINE SUPPLIES

"EVERYTHING FOR THE PIPELINER"

PERRAULT Brothers, Inc.
1130 NO. BOSTON,
TULSA, OKLA. • 5-1103

Export Office:
30 ROCKEFELLER PLAZA,
NEW YORK, N.Y.
CIRCLE 6-6260

INFERNO

"Safety Plus" Clamp Type Reflex Gauge

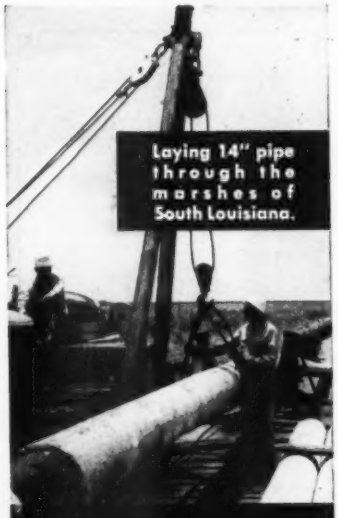
The scientifically designed clamps of the Inferno Clamp Type Reflex Gauge completely enclose each side of the gauge, but can be removed separately. Are easily held in place when installing new glass and gaskets. Clamps can be put on one at a time without uneven tightening of the glass. Write for Bulletin 19-B. Sold direct or through your supply store.

The INFERNO co.
Box 1138A
115 RICOU St.
SHREVEPORT, LA.

more trench
in more places
at less cost

See your local distributor. The Cleveland Trencher Company, 20100 St. Clair Avenue, Cleveland, 17, Ohio.

CLEVELAND TRENCHERS



HOUSTON
CONTRACTING COMPANY
General Contractors

OIL + GAS + GASOLINE + WATER PIPE LINES
LAURENCE H. FAVROT R. P. GREGORY GEO. A. PETERKIN
2707 FERNDALE PLACE HOUSTON 6, TEXAS

United has completed 68 miles of 16-in. and 25½ miles of 12, 10, 8, and 6-in. gathering lines connecting fields in Plaquemines Parish, Louisiana, with New Orleans.

The company also has completed laying 29 miles of 24-in. and 1½ miles of 16-in. across the Houston ship channel and about 4 miles of 12-in. from Missouri City Junction to points near the Shell Oil Co. refinery.

A 48-mile, 24-in. line has been completed from Baxterville to McComb, Miss.

Authorized. — United has authorized but not yet contracted a project involving construction of 39 miles of 16-in., 6 miles of 8-in., and 5 miles of 4-in. from the vicinity of Mobile, Ala., to near Pensacola, Fla.

FPC O.K.'s Construction of Antelope Valley Gas Line

WASHINGTON. — Construction of Southern California Gas Co. and Pacific Gas & Electric Co.'s proposed natural-gas lines into Antelope Valley of southern California has been o.k.'d by the Federal Power Commission.

Southern California's project involves construction of a 38-mile line from a proposed connection with Pacific's system near Mojave, Calif., to the communities of Mojave, Lancaster, Palmdale, and Rosamond in the valley. The project, estimated to cost $362,000, will supply natural gas to Mojave, Lancaster, and Palmdale, now served with liquefied petroleum gas, and to Rosamond, which has no gas service at present.

Pacific Gas was authorized to build a line tap and metering and regulating facilities on its line near Mojave to deliver gas to Southern California in exchange for gas which the latter will deliver to Pacific Gas at its Kettleman Hills, Calif., compressor station. These facilities will cost $10,000.

Panhandle Completes Line Tying in New Light Field

LIBERAL, Kans.—Panhandle Eastern Pipe Line Co. has completed an 11-mile natural-gas line tying in new Light gas field southeast of here with the company's facilities in Southeast Liberal gas field.

The new line provides the first market outlet for production from the new field which lies on the line between Beaver County, Oklahoma, and Seward County, Kansas. It is now taking gas from six wells in the field.

Panhandle is picking up about 20,000,000 cu. ft. of gas per day from five wells owned by J. M. Huber Corp., of Borger, Tex., which up to now is the principal operator in the field. Distillate produced with the gas is being trucked to Shamrock Oil & Gas Corp.'s plant near Sunray, Tex.

Several other development wells

Business
and Pleasure
in TULSA
means-

THE
MAYO
★ CENTRALLY LOCATED
★ AIR CONDITIONED
★ COFFEE SHOP

EXCEL-SO
SEPARATORS
DEHYDRATORS
are designed to remove free and emulsified water from petroleum products at any capacity or code construction.

WARNER LEWIS
COMPANY
P. O. BOX 3096-A • TULSA, OKLA.

POSITIVE
OIL SHOW
IDENTIFICATION
with MINERALIGHT Ultra-Violet (black light)
Don't pass up possible pay! Make positive core identification checks with new model MINERALIGHT SL long wave ultra-violet lamp.
PROVED BEST BY TEST FOR OIL SHOW ANALYSIS! Simple to operate. Lamp weighs only 1 lb. Models available for 110 volt AC or with adapter, 110 volt DC current. Battery operated model for field use holds lamp, has built-in viewer for daylight examination. Easily portable. Send for FREE brochure OG, "How to detect and analyze petroleum in oil surface samples with ultra-violet".

ULTRA-VIOLET PRODUCTS, Inc.
145 Pasadena Avenue, South Pasadena, Calif.

are now under way by Huber and other operators, and larger production from the field is virtually assured.

Service Completes Wyoming, New Mexico Crude Lines

Service Pipe Line Co.'s new 25-mile, 10-in. discharge and gravity line from Denton pool in Lea County, New Mexico, to a connection with the company's West Texas crude trunk at Wasson, Tex., has been completed.

C. M. Scott, general manager for Service, said larger runs of crude are now moving through the line. Oil formerly moved to Wasson through a 4-in. line. Pipe for the job, started late in September, was second hand and reconditioned. Crosley & Hardy Pipe Line Construction Co., Wichita Falls, Tex., was contractor.

Service's application for a certificate of convenience and necessity covering construction of a crude-gathering system in the Beaver Lodge area near Tioga in North Dakota is now being reviewed by the North Dakota Public Service Commission at Bismarck, N. D.

Agreement has been made with Vaughn & Taylor Construction Co., Inc., Tulsa, to build about 12 miles of 6-in. and 3 miles of 4-in. line if the application is approved.

Negotiations are under way with another contractor to erect necessary buildings and make connections between pumps, tanks, and loading rack.

In Wyoming, two more oil fields, Sage Springs Creek and North Sage Springs Creek in Natrona County have been connected with the company's system.

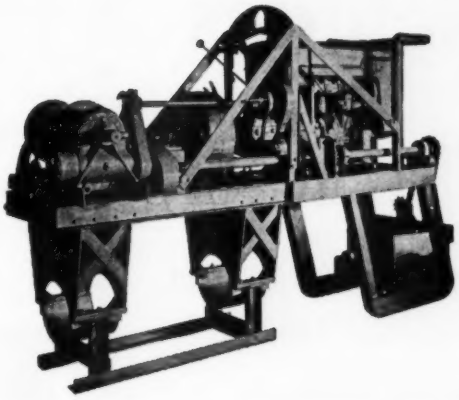
The 23-mile, 8-in. line connects with a company line now serving South Cole Creek field in Converse County. Final tests are now under way. Contractor, Vaughn & Taylor, began work in October but was delayed by bad weather. Reconditioned pipe was used.

Iowa-Illinois Gets O.K. On New $1,000,000 Line

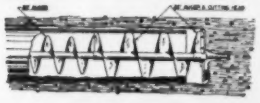
WASHINGTON.—The Federal Power Commission has affirmed an initial decision of one of its examiners authorizing Iowa-Illinois Gas & Electric Co., Davenport, Iowa, to build a 41-mile natural-gas pipe line for expanded service in the Iowa City-Cedar Rapids, Iowa, areas.

The new $1,000,000 line will parallel an existing lateral now serving the area. It will connect with the main line of Natural Gas Pipeline Co. of America in Washington County, Iowa.

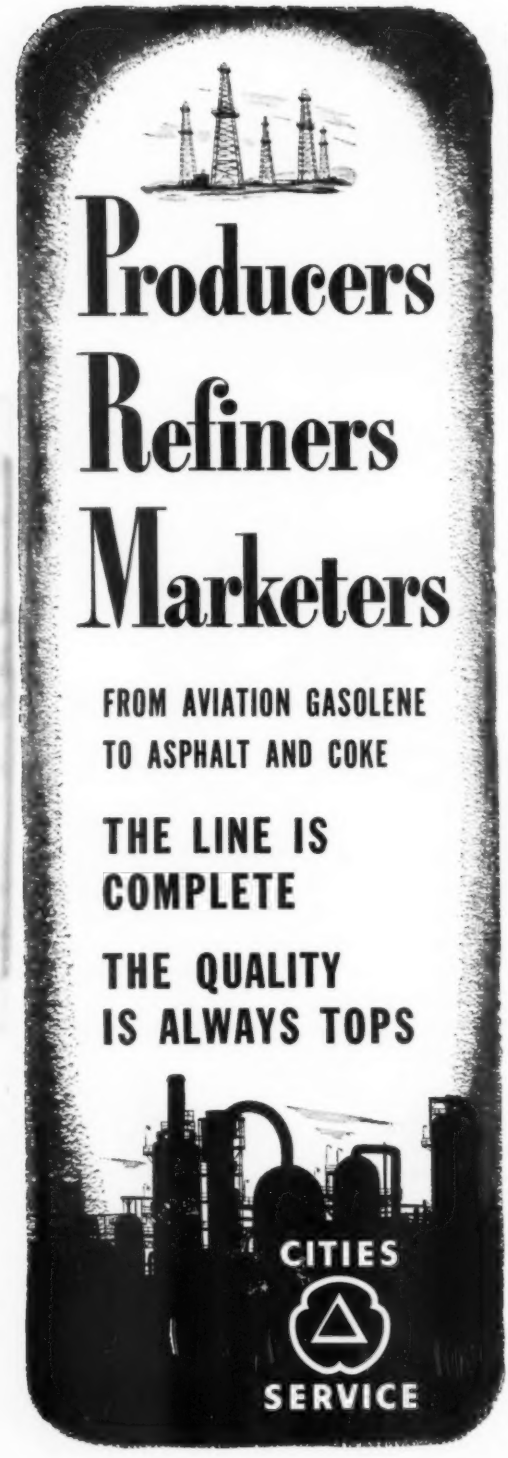
Estimated capacity of the new line is 36,960,000 cu. ft. per day. It will double the company's capacity to serve the Cedar Rapids - Iowa City market.



CROSE AUGER TYPE ROAD BORING MACHINE installs pipe casing up to and including 34" in diameter. This machine has proven highly satisfactory with Pipe Line Contractors for the fastest method of installing pipe casing where rock is not encountered. Machines for installing casing larger than 34" in diameter are also available.

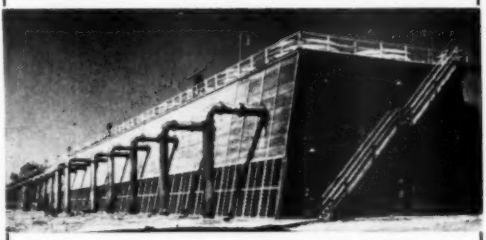


M. J. CROSE
MANUFACTURING COMPANY, INC.
2715 Dawson Road TULSA, OKLA. Phone 6-2173



COOLING TOWERS

ENGINEERING — ERECTION — REPAIRING



Guaranteed repair service on all makes and models of towers. Repair service available anywhere in United States.

We also manufacture spray towers, or induced draft and atmospheric towers.

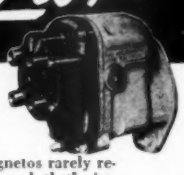
Cooling Tower Erection & Repair Service

Lloyd E. Kimmell

P. O. Box 163 Phone MO-2494

BELLAIRE, TEXAS

Walk away and forget it!



. . . that's what you do when your pumping engine is powered with a Fairbanks-Morse Super Spark Magneto. Just start the engine and forget about ignition failure. Super Spark Magnetos rarely require attention or maintenance, and that's important in these crucial days. Simple, modern design with fewer working parts assures "tops" in performance day after day under rugged operating conditions.

- **COMPACT** . . . one unit within a dust- and moisture-proof housing . . . unaffected by dirt, mud and water.
- **SIMPLE** . . . fewer working parts . . . easy access for adjustment and service.
- **DEPENDABLE** . . . quick starting . . . long lasting.
- **RUGGED** . . . oversize high tension coils . . . long lasting breaker points . . . ball bearings . . . one piece magnetic rotor.

Standardize on Fairbanks-Morse Super Spark Magnetos . . . proven by years of severe oil field service. Types for most engines. See your Fairbanks-Morse Magneto Distributor or Service Station, or write Fairbanks, Morse & Co., Magneto Division, Beloit, Wisconsin.

FAIRBANKS-MORSE

A name worth remembering

MAGNETOS ZC ENGINES MOTORS PUMPS DIESELS

REFINING

General Petroleum Launches Plant-Improvement Project

TORRANCE, Calif.—General Petroleum Corp. has launched a refinery-improvement project which will increase production of aviation-fuel components at its refinery here.

Key facility in the $500,000 project is the erection and revamping of a big distillation tower. The tower, 10 ft. in diameter and 157 ft. high, was built during World War II as a segment of a complete aviation-gasoline refining plant which was to be shipped to Russia under Lend Lease. The shipment was cancelled in 1945, and General Petroleum engineers located the tower and made possible its use through design adaptations.

Contract for erection has been awarded to J. B. Gill Co. New facilities should be in operation in June 1952.

Work on New Oil-Shale Retort Begins at Rifle

RIFLE, Colo.—Blaw-Knox Construction Co., Tulsa, has started construction near here of a $350,000 oil-shale retort for the Bureau of Mines.

The new retort will process between 150 and 300 tons of crushed shale daily. It will be placed within the framework of the large batch-type retorts built when the bureau's oil-shale demonstration plant was launched in 1947.

The older 40-ton retorts required charging and emptying for each cooking operation. Design of the new one, a continuous-flow type, has eliminated this efficiency drawback.

According to plant engineers, all gasoline-powered engines in the plant have been switched to operate on gasoline produced from oil shale. Octane rating of shale gasoline is reported by the bureau to be 82, higher than the regional average of 79.1 for petroleum gasoline.

Henry B. Morris, chief of refining operations, said that rapid progress has been made in obtaining better yields of higher-octane gasoline and in achieving cheaper and more efficient means of turning raw gasoline into a marketable product.

Work on the retort is going ahead on schedule, officials said, despite manpower reductions forced by congressional appropriations cuts.

1,000,000-Bbl. Refining Expansion to Take Longer

ATLANTIC CITY.—C. E. Davis, refining director of the Petroleum Administration for Defense, said last week that the refining-expansion goal now set at 1,000,000 bbl. per day will take 3 years instead of 2 due to materials shortages.

The continued threat of war and minimum requirements to meet that contingency make it essential that refinery expansion be accelerated to the limit and built up even beyond the present goal, he said.

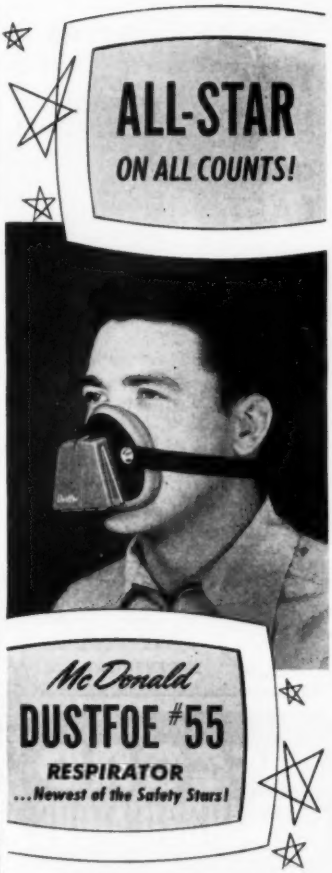
Speaking before the annual meeting of the American Society of Mechanical Engineers, Davis said that PAD considers the 1,000,000-bbl. expansion an absolute minimum, and

NELSON REFINERY-CONSTRUCTION INDEX

Appears in the first issue of each month.
Explanation—Cost-imating No. 61, December 15, 1949, pages 91, 92.
Compiled by W. L. Nelson—Refinery Consultant—Tulsa.
Indexes of Individual Equipment Items—January, April, July, October.

INDEX (1946 = 100)

	1947	1948	1949	1950	Aug. 1951
Centrifugal pumps	109.0	120.0	118.9	128.1	136.2
Reciprocating pumps	128.5	138.1	144.6	143.9	183.3
Compressor	114.0	128.0	120.0	118.8	138.1
Engines	109.0	120.0	115.5	117.9	137.1
Motors	110.0	112.7	114.0	130.8	148.8
Transformers	116.0	116.0	116.0	116.0	130.5
Instruments	113.0	120.0	122.0	127.8	142.4
Miscellaneous equipment average	114.2	122.1	121.6	126.2	145.2
Materials component	122.4	139.3	143.6	149.5	163.7
Labor component	113.5	128.0	137.1	144.0	154.3
Refinery construction index	117.0	132.5	139.7	146.2	158.1



★ *BREATHING—50% easier!*
★ *FILTER—new "Static-Web"!*
★ *MAINTENANCE—25% less!*
★ *WEIGHT—25% less!*
★ *SIZE—35% smaller!*
★ *AIR FLOW—Counter Gravity!*
★ *U. S. Bureau of Mines Approval #2166 for Dust*

Meet our newest safety star! Dustfoe #55 weighs less than 3 ounces—brings you all-star comfort, performance, protection! Revolutionary "Static-Web" throw-away filter retains dust electrostatically, needs no pre-filter. Filter is 50% narrower to eliminate "blind spots." There's nothing finer on any count!

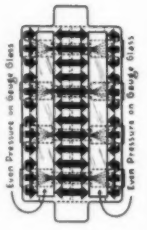
Write for Bulletin & Prices

B-F-McDonald COMPANY
Manufacturers & Distributors of Industrial Safety Clothing & Equipment

Safety FROM HEAD TO FOOT

5721 West 96th St., Los Angeles 45
Other Offices in San Francisco and Houston

Gauge Glasses That LAST and LAST and LAST

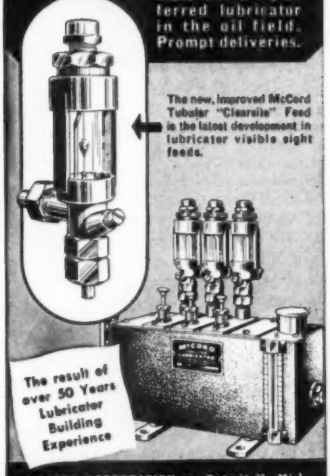


Inferno "Tailor-Made" Gauge glasses are of 1" glass that is Hard to Break! Transparent or reflex glasses may be installed. Tailor-Made gauges available in any sections up to 10' for visibility of 89". Ask for Bulletin 23. Sold by supply stores everywhere.

The INFERNO Co.
Box 1138A
115 RICOU St.
SHREVEPORT, LA.

McCORD CLASS S.F. LUBRICATORS

The McCord "SF" Lubricator provides close and accurate feed adjustments with a degree of reliability that has made this the preferred lubricator in the oil field. Prompt deliveries.


The new, improved McCord Tubular "Clearsite" Feed is the latest development in lubricator visible sight feeds.
The result of over 50 Years Lubricator Building Experience

McCORD CORPORATION • Detroit 11, Mich.

that other studies now going on will probably indicate that considerable additional capacity will be needed to fill requirements from all sources under emergency conditions.

Conditions for the immediate future in regard to both civilian and military demands look favorable, he said, although spot shortages of products may develop from time to time, especially in winter months.

PAD Surveys District 1, 2 Finished-Product Storage

WASHINGTON.—A canvass of finished-product storage capacity in Petroleum Administration for Defense Districts 1 and 2 is being made by that agency.

PAD officials emphasized the survey is not being made in expectation of any general shortages but to secure information which will aid in dealing with any spot deficiencies which may arise during the winter because of weather or transportation conditions.

Questionnaires are being sent to all operators in the two districts with 10,000-bbl. or more storage location for finished products to get information on tank capacity. The questionnaires do not cover unfinished oil tankage, crude tankage, consumer tankage, or tankage leased to the armed services. They do cover tankage leased to government agencies other than military.

1951 Federal Oil Revenues Estimated at $700,000,000

WASHINGTON.—Treasury revenue from the three federal oil taxes will run in the neighborhood of $700,000,000 this year, it is indicated by figures on collections for the first 10 months. Total receipts for all of 1950 were $665,000,000.

For the 10-month period, the Internal Revenue Bureau's monthly report shows collections of $496,606,636 from gasoline, against $455,309,196 last year, $73,346,722 from lubricating oils, against $74,656,339; and $21,456,397 from pipe-line transportation, against $16,819,926.

Receipts for the month of October alone included $60,033,376 from gasoline, against $46,924,456, a year ago; $7,866,570 from lubricating oils, against $12,638,008; and $2,677,815 from pipe-line transportation, against $1,817,134, the bureau announced.

Refining Briefs

The Defense Production Administration has given the Petroleum Administration for Defense the green light for a 10,000,000-lb. per month expansion program for detergents for lubricating oils and a 15,000-bbl. per day expansion of lubricating-oil facilities.

IN STOCK AT **Wood's** **DALLAS** WAREHOUSE

SHEAVES • PULLEYS • HANGERS • PILLOW BLOCKS (Plain, Babbitted and Ball Bearing) • COUPLINGS (Flexible, Flanged and Compression Types) COLLARS • "SURE-GRIP" SHEAVES AND PULLEYS • "SURE-GRIP" INDUSTRIAL V-BELT • "SURE-GRIP" FHP SHEAVES AND V-BELTS • COMPLETE DRIVES.

Write for detailed information.

T. B. WOOD'S SONS COMPANY
1117 W. COMMERCE ST., DALLAS, TEXAS
Main Office & Factory: Chambersburg, Pa.
Branches: Boston, Mass., Newark, N. J., Cleveland, O.

OIL and GAS BURNING EQUIPMENT for PETROLEUM REFINERIES

Detailed Information Gladly Sent Upon Request

CHEMICAL-PETROLEUM DIV.
NATIONAL AIROIL BURNER COMPANY, INC.
1236 E. SEDGLEY AVE., PHILADELPHIA 34, PA.
Southwestern Division: 2512 So. Blvd., Houston 6, Tex.

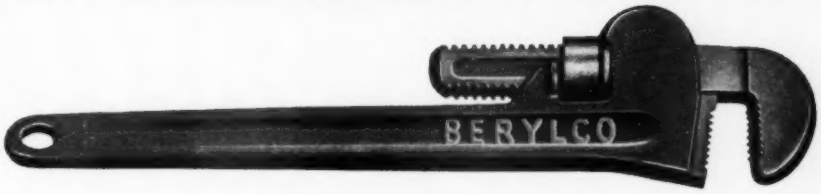
"GUNITE" CONCRETE
(SINCE 1915)
LININGS FOR

BUBBLE TOWERS • SETTLERS • STILLS • SEPARATORS • TANKS • AND VESSELS OF ALL TYPES • ENCASING AND FIREPROOFING STRUCTURAL STEEL AND PIPE • LINING WATER RESERVOIRS, DITCHES, DRAINS, AND CANALS • REPAIRING DISINTEGRATED CONCRETE AND OTHER MASONRY.

See our catalog in Sweet's

GUNITE CONCRETE & CONST. CO.
1301 Woodswether Road, Kansas City 6, Mo.
DISTRICT BRANCH OFFICES
Paul B. Watts, 228 N. La Salle St., Chicago 1, Ill.
George R. Lewis Co., 2036 Queen Avenue S., Minneapolis 5, Minn.
B. H. Mueller Co., 6625 Delmar Blvd., St. Louis 5, Mo.
Ole K. Olsen Co., 823 Perdido St., New Orleans, La.
Philip D. Barnard, 2036 Addison, Houston 5, Tex.
Western Steel Prod. Co., 1735 W. 13th Ave., Denver 4, Colo.

This wrench protects your plant!



BERYLCO SAFETY TOOLS resist sparking... are noncorrosive and nonmagnetic

Berylco Safety Tools, made of high-performance beryllium copper, have hundreds of applications in...

Petroleum Industry—pipe lines, pumping stations, tankers, refineries, distributing centers.

Chemical Plants—process equipment, storage tanks, tank cars, or wherever corrosive agents affect steel tools.

Maritime Service—fuel lines, or wherever resistance to excessive salt-water corrosion is needed.

Explosives Plants—pipelines or places where explosives are handled or stored.

Gas Industry—gas wells, pipe lines, gas-manufacturing plants.

Municipal Maintenance—underground gas and sewer lines.

General Industry—fuel lines or pipe lines and tanks containing solvents, and wherever inflammable liquids, gases and dusts are stored or handled.

SEE YOUR LOCAL JOBBER TODAY!

BERYLCO THE **BERYLLIUM** CORPORATION

DEPT. IL, READING 15, PENNSYLVANIA

VALVES STICK?

the Problem Can be Licked

Electrofilm

BONDED TO METAL "DRY" LUBRICATION

Recommended where ordinary lubrication is not adequate due to temperature, solvents, accessibility, etc.

Job Shop Facilities to Serve You in Principal Cities

Electrofilm S. F. L. "dry" lubrication takes up where ordinary methods are not practical—for valves, couplings, pumps, gears, hinges, etc. Electrofilm also has excellent oil retention qualities to provide additional lubrication for gas engines, electric motors, etc.

Used by

U. S. Navy, Army Air Force, Atomic Energy Commission, Aircraft Mfgrs., Automobile Mfgrs., Refineries and hundreds of nationally known industries.

Electrofilm CORP.

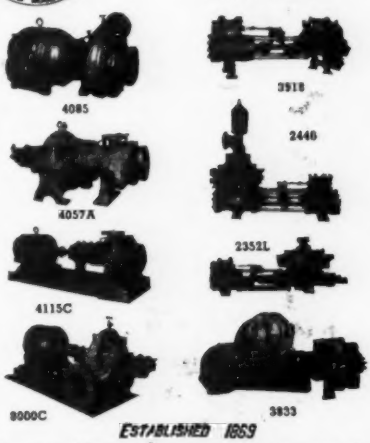
7116 Laurel Canyon Blvd — No. Hollywood, Cal.

PUMPS

CENTRIFUGAL RECIPROCATING

BUILDERS OF OUTSTANDING PUMPS

Since 1869



ESTABLISHED 1869

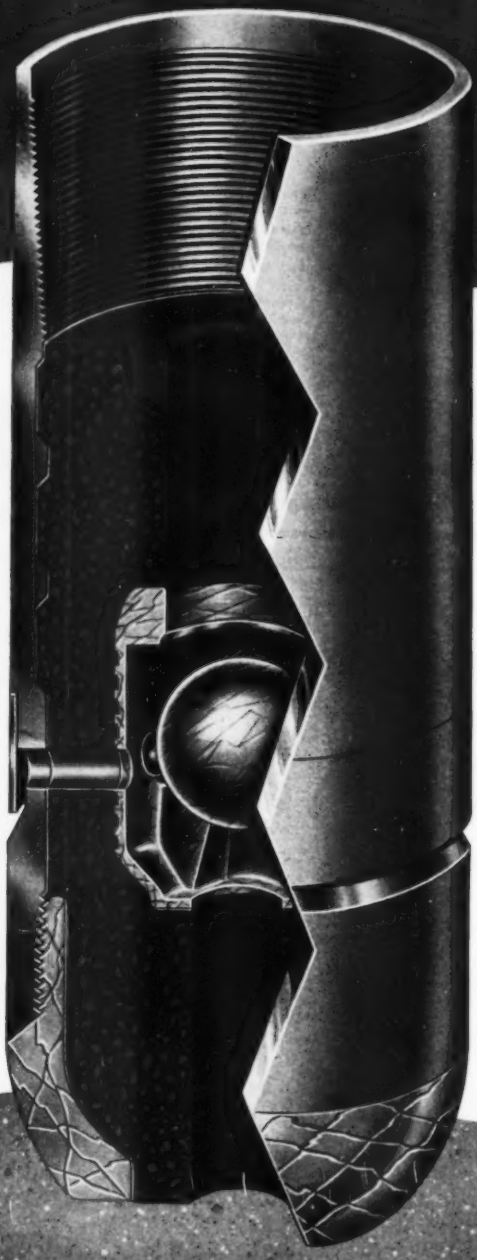
DEAN BROTHERS PUMPS INC.

INDIANAPOLIS IND.

323 W. TENTH ST.

FOR GREATEST STRENGTH-SAFETY-

Specify LARKIN Geyser Shoes



In honest recognition of the fact that miracles cannot be accomplished with a cementing shoe . . . that other factors beyond the scope of such equipment also affect your cement job, Larkin claims that the Geyser Shoe incorporates ALL the advantages obtainable in such equipment.

The Geyser Shoe discharges cement slurry around the casing with a jetting turbulence which removes mud cake for a considerable distance up the hole. When casing is properly centered, Geyser action will surround the important lower section of the casing string with an evenly distributed body of cement. This is the foundation for a successful, unchanneled cement job.

The Geyser Shoe will guide and "float" the longest of casing strings safely to bottom and the strength and efficiency of its back pressure valve has been demonstrated in tens of thousands of wells. For safe, successful well cementing, specify Larkin "... through your Supply Store."

LARKIN

...Through Your Supply Store

LARKIN PACKER CO., INC. ST. LOUIS, MO.

Among the Drilling Contractors

Dallas Firm to Drill Four Tests for Gulf

Survey Drilling Co., Dallas, is starting the first of four exploratory tests it has contracted to drill for Gulf Refining Co. on the latter's 60,000-acre Crosby Lumber & Manufacturing Co. lease holding in Wilkinson County, southeastern Mississippi. Three contracts are for 7,000 ft. The fourth is for 7,800 ft.

The first operation is located 2 miles southeast of Ireland in 15-4n-1w. Locations also have been made for a test 3 miles southeast of Lanehart, in 50-3n-3w; another 2½ miles south of Wilkinson, in 33-3n-1w; and the other 3½ miles southwest of the latter city, in 26-3n-1w.

McConnell to Expand Williston Operations

McConnell Drilling Co., Farmington, N. M., is opening an office at Bismarck, N. D., from which it will direct its contracting operations in the Williston basin district of western North Dakota and eastern Montana. The company now has one rig running in the district and is arranging to move in another in the immediate future. It also is considering its other five rigs to this area within the next year. The rig now running in the district is on Shell Oil Co.'s indicated deep discovery well, 1 Northern Pacific, in the Richey area, Dawson County, Montana.

Atkins & Potter have been awarded the contract for a 6,000-ft. test which Eason Oil Co. and Wilcox Oil Co. jointly projected for the area north of Pond Creek, and 7 miles northeast of the Rich Valley field, Grant County, northern Oklahoma. Location, on the operators' Hudson lease, is in the NW SW SE 14-26n-6w.

Shamrock Drilling Co. is moving in a rotary rig for a wildcat test which Standard Oil Co. of California will drill on its Desolation unit, in Millard County, Utah. Location is in the C NE NW 8-15s-17w.

Big Chief Drilling Co., Oklahoma City, will drill Pure Oil Co.'s third test on its 45,000-acre Low-Gap-Unit block in Johnson County, northwestern Arkansas. The new test, located in 30-11n-24w, 2½ miles northwest of Harmony, is 6 miles southwest of Pure's second test, completed last July as a small gas discovery well in Atoka sand at 1,275 ft. It is 3 miles southwest of No. 1, a dry hole at a total depth of 3,945 ft. Rotary tools will be used on the new test. The first two tests were drilled with cable tools.

Zephyr Changes Name Of Drilling Company

Name of the drilling contracting company formerly operated as The Zephyr Corp., has been changed, effective December 1, to the Zephyr Drilling Corp., F. G. McClintock, president, announces.

The company, headquarters of which are in the First National Bank Building, Tulsa, operates 10 rotary rigs in southern Oklahoma and the West Texas area. Operating headquarters for the latter area are located at Midland.

Dirickson-Lewis Drilling Co., Tulsa, has a contract with Woods Oil & Gas Co. for a Red Fork sand test to be drilled at a wildcat location a half mile west of the Southwest Council Creek pool, Payne County, Oklahoma. The latter pool produces from Bartlesville sand. The Red Fork test will be 1 Wilson, in the SE SW SW 13-19n-3e.

Arrow Drilling Co., Dallas and Tulsa, is moving a heavy-duty rotary rig to the old Moore field, in Cleveland County, Oklahoma, where it will drill for Anderson-Prichard Oil Corp. at 1 Gross, C SW SW 28-10n-2w, a projected 8,000-ft. test.

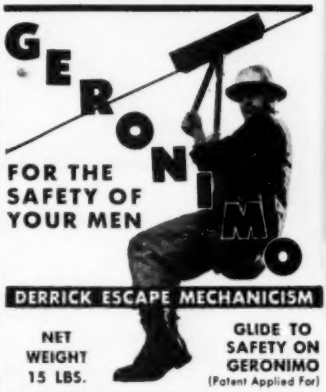
Peak Drilling Co., Casper, is getting rigged up for a wildcat test which it will drill under contract for T & O Oil Co. at 1 Ohlhauser, in the C NE SE 6-132n-78w, in the Linton area, Emmons County, North Dakota.

Crow Drilling Co., Inc., Shreveport, has contracted with Brown Paper Mill Co. for two 7,000-ft. tests to be drilled on the latter's fee lands in the Atlanta area, in Winn Parish, Louisiana. One test will be drilled at a location 3 miles north of Atlanta, in 14-10n-4w. The other will be in 19-10n-3w, 4½ miles southeast of town.

Butler-Johnson Service Co., Shreveport, is drilling on two new Louisiana contracts. One is a 3,000-ft. Paluxy test for James Muslow and associates at a wildcat location, 1 Westdale, 35-14n-11w, 3 miles north of the Bull Bayou field, Red River Parish. The other is a 3,850-ft. wildcat test for Monta Gas Co., Inc., in Ouachita Par-

The man on the rig knows that for a tight seal and easy separation of parts you can't beat 'Bestolife Lead Seal Tool Joint and Casing Compound. Standard of the oil industry for 20 years. Unconditionally guaranteed. Sold and exported by supply houses throughout the world.

I. H. GRANCELL
1601 EAST NADEAU STREET
LOS ANGELES 1, CALIFORNIA



DERRICK ESCAPE MECHANICISM

NET WEIGHT 15 LBS.

GLIDE TO SAFETY ON GERONIMO
(Patent Applied For)

GERONIMO will stand hardest wear and give unfailing protection to refinery and derrick men whose lives are endangered by fire, escaping gases or other hazards.

EASILY ATTACHED OR REMOVED
EXTRA STURDY CONSTRUCTION
QUICKLY STRADDLED
POSITIVE, INSTANT BRAKE
BRONZE "No-Spark" SURFACES
RECOMMENDED FOR ½" WIRE LINE

• Write for Illustrated Folder •

SOLD THROUGH YOUR SUPPLY STORE
— MANUFACTURED BY —
CHARLIE'S MACHINE WORKS
PERRY, OKLAHOMA

Standco
NO SMOKE
STANDCO BRAKE LINING
Nothing novel—no bunk, but it gets the job done without scoring brake rims. See pages 3608-3613, Composite Catalog.
Standco Brake Lining Co.
HOUSTON

SAFEGUARD YOUR ENGINE
Industrial
Electric Tachometer's
(R.P.M. Indicator)
Complete in one unit. Quick and easy installation. Checks correct operating speed. For all internal combustion engines.

Write For Detailed Information
WAIT MFG. CO.
P. O. BOX 1015 TULSA, OKLA.

ish. The latter, 1-A Huenefeld, 6-17n-5e, is 1,200 ft. west of a test recently completed by the same operators as a dry hole at 6,329 ft. but which had showings in several shallower formations.

Fred Morgan Drilling Co. is the contractor on a deep test which Max Pray and associates are starting at an outpost location south of production of the Southwest Wayne field, McClain County, Oklahoma. Location is on the operators' Wigley lease, in the NW NE NE 35-5n-2w. Contract is for 8,500 ft.

Musgrove Petroleum Corp., Wichita, has contracted one of its rigs for a wildcat test in western Gove County, western Kansas. The test will be drilled for the Abell family on the latter's farm, 11 miles west of Gove, the county seat. Location is in the SW SW SE 30-12-30.

Marsdale Drilling Co., Duncan, Okla., is the contractor on a new, shallow, Arbuckle lime test being started at a location about a mile east of the Asphaltum pool, in Jefferson County, in the extreme southern part of Oklahoma. The test, contracted to 2,500 ft., is being drilled for J. E. Kennedy and Bar J Oil Co. at 1 Featherstone, in the SE SE SE 22-3s-5w.

H.E.R. Drilling Co., Oklahoma City, is drilling on a contract it has with Kirkpatrick Oil Co. for a 7,200-ft. semiwildcat test in the narrow gap between the Katie and Southeast Katie pools in Garvin County, Oklahoma. The new operation is 1 Trapp, in the C SW NE 8-1n-1w.

Fleet Drilling Co., Ada, Okla., has contracted for a 6,400-ft. Wilcox sand test to be drilled for Ryan Oil Co. at an outpost location, ¾ mile northeast of production of the Roulette Creek field, eastern Cleveland County, Oklahoma. Location is for 1 Smith, NE NE SW 10-8n-1e.

ACTIVE ROTARY RIGS*

United States and Western Canada)

Area—	Week ended 11-26-51	Change week ended 11-19-51	Change week ended 11-27-50
Gulf Coast	622	+11	+ 77
W. Tex.-N. M.	1,061	+10	+257
Ark.-N. La.-E. Tex.	194	+ 6	+ 31
Oklahoma	350	+ 2	+ 69
Kansas-S. Nebraska	187	— 9	+ 31
Illinois-Eastern	144	— 1	+ 19
Rocky Mountains	197	— 2	+ 70
Pacific Coast	177	+ 2	+ 41
Total U. S.	2,972	+19	+595
Western Canada	162	— 1	+ 49
Total	3,134	+18	+644

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Pacific Coast and Illinois-Eastern areas are shown on pages 158 and 159.

HENRY H. PARIS DISTRIBUTOR Inc.
Manufacturer's Agent - Oil Well and Refinery Supplies
P. O. BOX 932 1125 ROTHWELL ST.
HOUSTON, TEXAS

Agent and Distributor for the following Nationally Known Manufacturers:

W. C. NORRIS MANUFACTURER, INC.
Tulsa, Oklahoma
Quality Pumping Equipment, Swage Nipples, Bull Plugs, Welding Fittings, etc.

WHEELING MACHINE PRODUCTS CO.
Wheeling, West Virginia
XL Steel Pipe Couplings for OIL COUNTRY TUBULAR PRODUCTS.

THE OHIO INJECTOR COMPANY
Wadsworth, Ohio
OIC VALVES Bronze, Iron, Cast and Forged Steel for all purposes.

HARRISBURG STEEL CORPORATION
Harrisburg, Pennsylvania
Forged Steel Flanges and Seamless Casing Couplings.

DRESSER MANUFACTURING DIV.
Bradford, Pa.
Seamless Welding Fittings.

VOLCANO BURNER COMPANY
Houston, Texas
Volcano Superior and Gulf States All Steel Gas Burners for OIL COUNTRY BOILERS.

OIL STATES EQUIPMENT COMPANY
Houston, Texas
OSECO Silvertop Fusible Plugs with renewable inserts for all types OIL COUNTRY BOILERS.

WESTERN SAFETY BARREL STAND
Houston, Texas
Stand lifts, holds, tilts 55 gal. barrels. Prevents spillage—easily loaded.

STEEL FORGING, Inc.
Shreveport, La.
Weld Saddles and Weld Sleeves.

C-S NEW Luxury CONSTELLATIONS

NOTHING FINER! NOTHING FASTER!

FLY C&S direct to

CHICAGO & SOUTHERN AIR LINES

VENEZUELA!

CUBA — JAMAICA

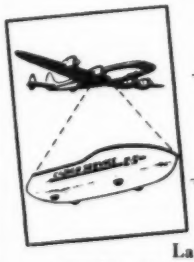
via

NEW ORLEANS GATEWAY

Flights each way Every day!

Fastest daily service from the Southwest! C&S New Luxury Constellations offer 300-m.p.h. pressurized cabin service to the oil fields of Venezuela and South America through the New Orleans gateway. One carrier service from Houston, St. Louis, Chicago and Detroit, with connections at New Orleans to and from New York, Dallas, Tulsa, Los Angeles and San Francisco. For reservations call the nearest C&S ticket office or your Travel Agent.

C&S NEW LUXURY CONSTELLATIONS OFFER FASTEST SERVICE BETWEEN HOUSTON AND CHICAGO; HOUSTON AND DETROIT; NEW ORLEANS AND DETROIT.



SHIP

C-S SPEEDPAK

Large SPEEDPAK units, carrying as much as most two-engine cargo planes, are attached to the 300-mile-per-hour C&S CONSTELLATION . . . providing a lower deck exclusively for cargo. C&S is the *only* air line operating SPEEDPAK service to Cuba, Jamaica and Venezuela!

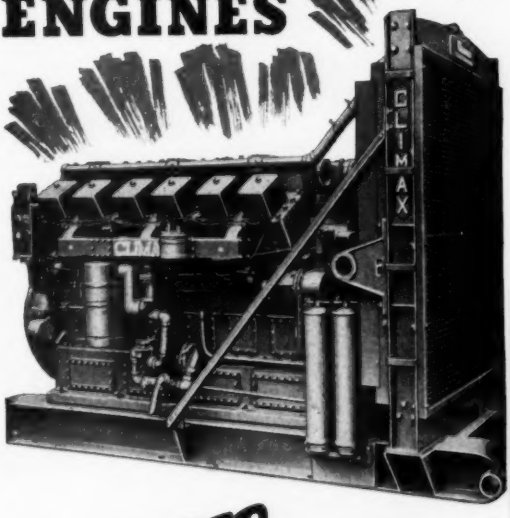
CHICAGO & SOUTHERN AIR LINES

Offices in Principal Oil Centers in the United States

climax

BLUE STREAK

ENGINES



POWERED FOR DEEP DRILLING

HERE is great unfailing, economical power for deep drilling operations. Used singly, in pairs, or triple series, this Climax valve-in-head Blue Streak Engine is a sturdy, flexible prime mover. Accelerates from "idling" to top speed and full power in seconds.

They operate smoothly, efficiently, and always with reserve power, on natural gas, butane or gasoline.

The V-120 is built to sustain Climax Engine records of years of trouble free service — Thousands of hours of operation with no major overhaul.

For complete information write . . .

climax ENGINE AND PUMP MFG. CO.

Factory and General Office Clinton, Iowa

Regional Offices Chicago - Dallas - Long Beach, Cal.

CHAPTER NINE *in the Fascinating Story of the Search for Oil*

was developed in Germany and reduced to practice by L. Mintrop of Germany. First use of the instrument in North America was in Mexico and the Gulf Coast of Texas and Louisiana. Refraction crews began working in the Gulf Coast region about 1924, and were credited with the first seismic discovery in the United States. This illustration shows an early model Mintrop Instrument. When records were being made, the tent flaps were dropped to form a dark room. Tremendous explosions were detonated to induce waves into the earth. A detector . . . with three to five spaced one mile apart in an arc . . . was placed immediately in front of the recording instrument, and it transmitted the wave motion to sensitized paper by means of a light beam.

is still a master key to progress in the search for hidden oil traps; however, a second factor is equally important in present-day exploration. That factor is accurate interpretation of the complex data obtained. With a backlog of more than 16 years' experience . . . plus a record of leadership in instrument improvements to meet specific needs for various areas . . . General Geophysical is better equipped to determine and locate conditions favorable to finding new oil reserves. So when you plan to explore new areas and deeper horizons, let General's capable crews help you. They have an enviable finding record from the Gulf Coast to Canada.

General GGC
GEOPHYSICAL COMPANY
GULF BLDG. HOUSTON

A Dark Horse in the Rockies

AS a result of three discoveries in as many states during the past 9 months, the Upper Cretaceous-Mesaverde, a "formation" found here and there throughout a large portion of the Rocky Mountain area, is now being studied with increased respect.

Though the potentialities of the Mesaverde as a gas producer in the San Juan basin (H on map) have been forcibly demonstrated, the formation has never been attacked to the north with the enthusiasm needed to determine its capabilities there.

The map shows in a much simplified and general way the location of the Cretaceous geosyncline. Within the white area, Cretaceous seas moved back and forth, in and out, while along the east and west edges land masses were being cut down. A greatly simplified picture of Cretaceous deposition would show marine sediments down the fairway with interfingering and overlapping nonmarine sediments at the edges, especially to the west where the mountains were, perhaps, higher. Following the deposition of the Cretaceous there was a period of mountain making which uplifted the Mesaverde (to be cut away) or downwarped it deep into what are now Tertiary basins.

The Mesaverde group represents a facies between the continental facies of the western edge of the trough and the marine facies of the fairway as illustrated in the Uinta basin where the Mesaverde may be divided into two parts. The lower 2,000 ft. or so is a marine succession of sandstones and the upper 900 ft. or so is of brackish to fresh-water sandstones, sandy shales, carbonaceous shales, and coal which grade laterally into marine shales. Here the Mesaverde group is considered Niobrara equivalent while eastward in Colorado and Wyoming it is believed to correspond more to the younger Pierre.

Down in the San Juan basin where the Mesaverde is divided into three formations, a similar story is indicated. Here the group is a large porosity wedge, partly marine and partly nonmarine, between converging Lewis and Mancos shales (both marine). The Mesaverde reaches thicknesses of 3,500 ft. in this basin. It was deposited in coastal swamps and

deltas on top of and perhaps concurrent with the Mancos shale as debris from rising mountains to the west and southwest.

The three recent discoveries that have excited interest in the Mesaverde group are:

1. Last April a Stanolind Oil & Gas Co. Tensleep-bound well at Beaver Creek (B on map) tested the Mesaverde and found oil. In July Stanolind completed the first Mesaverde producer in the field for 260 bbl. of oil daily. Previous Mesaverde production in Wyoming had been a disappointing oil well at West Poison Spider (C), which is now being deepened, and eight small oil wells at Simpson Ridge (D). Abandoned Golden Eagle (A), had produced some gas from the Mesaverde.

2. About a month after Stanolind's indication of Mesaverde oil, Johnson and Bunn brought in a Mesaverde gas well at the southeastern edge of the Uinta basin just inside the Colorado line (F on map). This well potentialed 8,000,000 cu. ft. of gas daily and, therefore, was not carried to the Sundance or Weber as originally planned.

3. Carter Oil Co. is going deeper at its Uinta basin Willow Creek wildcat (E on map), a proposed 9,000-ft. Mesaverde test which recovered 270 ft. of 40°-gravity oil on a 4-hour drill-stem test in the Mesaverde at 8,200 ft.

Florence field (G on map), discovered in 1862, has produced nearly 15 million barrels of oil from fractures in the Pierre shale, possibly a time equivalent of some of the Mesaverde as noted above. There also has been some Pierre production at Boulder, 180 miles north of Florence field.

Of course just what will result from the growing interest in the Mesaverde remains to be seen, but right now the formation's future should not be underestimated. The little that is known about the origin and accumulation of petroleum indicates that the Mesaverde may prove a most attractive objective over a large area. *Philip C. Ingalls.*

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

TEXAS GULF COAST.—Deep Wilcox production has been opened 6 miles south of Yarboro in Grimes County at Gulf Oil Corp. 1 William Gardner. From perforations at 10,392-10,405 ft., the well flowed at the rate of 142 bbl. of oil daily through 9/64-in. choke. This wildcat opened the second commercial oil producer in Grimes County.

SOUTH LOUISIANA.—A new world producing depth record is indicated at Shell Oil Co. 1 Gonsulin, Weeks Island field, Iberia Parish. The test (previous production depth record for the Gulf Coast region) recently recovered 188 bbl. of oil from 16,572-16,700 ft.

ROCKY MOUNTAIN AREA.—Shell Oil Co. is testing two northeastern Montana wildcats which intensified the Williston basin play. The Richey area well is flowing oil with acid water from the Charles, and the Pine Unit wildcat is making oil on swab tests of Ordovician. Stanolind Oil & Gas Co.-Continental Oil Co. continue to find oil on tests of Tensleep at their North Fork, Wyoming, discovery.

South Louisiana

Shell's Weeks Island Test Produces Below 16,572 Ft.

NEW ORLEANS.—Indications of a new world's record for depth of production was the recovery obtained this week from the Shell Oil Co. 1 H. T. Gonsulin in Weeks Island field of Iberia Parish. While recovery of 188 bbl. of oil per day on 11/64-in. choke was obtained from perforations at 16,572-16,700 ft., the well is not being finaled at this level due to the high gas-oil ratio of 15,370:1. Previously Shell had set a new production depth record for the Gulf coastal region with this same well, when recovery was obtained last August at 15,-296-15,336 ft.

Pan Am Southern Corp. has staked location for its 1 Southwestern Improvement Co. wildcat in the C NW SW of 1-2n-6e, Avoyelles Parish. Proposed depth is 9,300 ft. with Glasscock Drilling Co. as the contractor.

Hunt Oil Co. is drilling below 7,045 ft. in sand and shale at its 1 Ellis Reynaud wildcat, 7-3n-4e, Avoyelles Parish, in the North Marksville area.

In the Lake Pearl area of Avoyelles Parish W. A. Moncrief 1 Virgil Descant, 31-1n-4e, is coring at 10,465 ft., and is now scheduled to go to 10,600 ft. Operator has cemented 5½-in. casing at 10,002 ft.

SOUTH LOUISIANA WILDCAT FAILURES

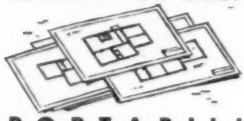
Avoyelles Parish: Texas Pacific Coal & Oil Co., et al, 1 C. H. Fisher, 33-3n-5e, dry, TD 8,518 ft.

Plaquemines Parish: The California Co. 1 Grand Prairie Levee Dist. 4-St. 1785 Unit 1, 18-19s-18e, dry, TD 10,649 ft.

Rapides Parish: Warren Oil Corp. 1 Raymond Veal, 33-1n-1e, dry, TD 11,002 ft

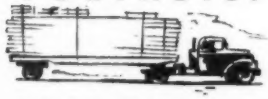
GET THESE EXTRAS IN
STURDYBILT
PREFABRICATED HOUSES

VARIETY OF DESIGNS...



Choose from a large selection of homes, garages, warehouses and other buildings. Get what you want in STURDYBILT.

PORTABILITY...



Complete housing sections moved anywhere a truck can go. Buildings erected on your site in days instead of weeks.

DEMOUNTABILITY...

Move your STURDYBILT houses when you abandon an old site. They can be erected on new location with practically no loss of material.

ONE SOURCE...

One purchase order takes care of designing, transporting and erecting. Truly one stop buying when you get STURDYBILT Prefabricated Houses.

MANUFACTURERS OF SPECIAL MILLWORK: DISTRIBUTORS OF JOHNS-MANVILLE BUILDING MATERIALS; CURTIS WOODWORK

STURDYBILT PREFABRICATED, DEMOUNTABLE HOUSES

SOUTHERN MILL & MANUFACTURING CO. • TULSA, OKLAHOMA

STURDYBILT HOUSES COMPLY WITH COMMERCIAL STANDARD CS135 OF THE NATIONAL BUREAU OF STANDARDS FOR PREFABRICATED HOMES

Rocky Mountain

Williston Basin Wildcats Producing Oil After Acid

DENVER.—Two Montana wildcats are making oil following acid treatment for the first near-completions in the Williston basin of this state.

Shell Oil Co. plugged back 1 Northern Pacific, SE NW NW 19-23n-50e, to the Charles and acidized that formation with 1,500 gal. The well flowed acid water and oil to the surface in 27 minutes, gaging 2,064 bbl. of fluid, 19 per cent water and acid and the balance 38°-gravity oil, in 24 hours. The test was through open tubing, and the operator is continuing to test through ¼-in. choke. The well made 409,000 cu. ft. of gas daily with the test, for a gas-oil ratio of 2,096:1. Production packer was set at 7,075 ft., with tubing at 7,179 ft. and plugged-back depth at 7,275 ft. This wildcat was drilled to 10,518 ft., total depth, through Ordovician, prior to plugging back for tests of the Charles, topped at 6,695 ft.

At the Pine Unit wildcat, SW SW NE 30-12n-57e, Wibaux County, 75 miles south of the Richey well, Shell is perforating and testing with the well making oil from the basal Ordovician. Ordovician was topped at 9,020 ft. (?), and first perforations were at 9,151 ft., with the well making only a small amount of mud. The zone 9,115-44 ft. showed 285 ft. of mud with a slight amount of noncombustible gas. Following a 1,000-gal. acid treatment the well made 9 bbl. of 20°-gravity oil and 43 bbl. of water in 12 hours and later 143 bbl. of oil and 31 of water in 21 hours. The zone 9,068-80 ft. was then perforated, and the operator swabbed 113 bbl. of 18°-gravity oil in 12 hours. The zone was acidized with 1,000 gal., and the well swabbed 170 bbl. of oil and 87 bbl. of water in 12 hours. Operator is continuing to swab.

The Texas Co.'s 1 Northern Pacific, C NE NE 35-15n-54e, on Cedar Creek (Baker-Glendive) between the two Shell wildcats, is still at 9,079 ft., after the operator tested oil in a 200-ft. interval of Ordovician. Texas is preparing to run casing for completion of the well.

Stanolind Oil & Gas and Continental Oil Co. are coring below 6,780 ft. in Tensleep after finding more than 224 ft. of saturation at the North Fork, Wyo., discovery. The well is 1 Government-Mains, C SW SW 19-44n-81w, Johnson County, northwest of the Sussex-Meadow Creek pools. Tensleep was topped at 6,488 ft., and casing cemented on top of that formation. Successive drill-stem tests of intervals in the Tensleep continued to have good oil recovery to the zone 6,705-75 ft., which made 120 ft. of oil, 100 ft. of oil-cut mud, and 295 ft. of water. Hourly tests showed as much as 4,000 ft. of oil in approximately 60-ft. intervals.

British-American Oil Producing Co. has shut in the discovery at 1 State-Horne Bros., NW SW NW 16-21n-78w, Carbon County, Wyoming, after swabbing 24 bbl. of oil per hour on 2-hour test of the well. Production is from the Sundance sand between 6,235-40 ft. and 6,228-34 ft., where casing was perforated. The discovery is 4 miles east of Medicine Bow field, where Sundance is a primary producing formation.

WYOMING WILDCAT FAILURES

Fremont County: West Beaver Creek: J. A. Terteling & Sons 1 Govt., C SE NW 8-33n-96w; TD 6,379 ft., dry, Mesaverde 5,080 ft.

Sage Creek: Continental Oil Co. 1 Sage Creek, NW SW SW 27-1n-1w (WRM); TD 3,671 ft., dry, Amsden 1,250 ft., Darwin 1,493 ft., Madison 1,560 ft., Darby 2,195 ft., Big Horn 2,225 ft., Lander 2,370 ft., Gallatin Fault 2,375 ft., Big Horn 3,328 ft., Lander 3,625 ft., Gallatin 3,630 ft.

Natrona County: South Teapot: Crude Oil Producers Corp. 1 Govt., C NE NW 3-37n-78w; TD 7,131 ft., dry. Teapot 1,150 ft., Parkman 1,578 ft., Shannon 3,465 ft., first Wall Creek 5,735 ft., second Wall Creek 6,152 ft., Muddy 6,901 ft., first Dakota 7,066 ft., second Dakota 7,062 ft., Fuson 7,100 ft.

Niobrara County, Bucktail: H. A. Hackathorn 1 Govt., NW NW SW 15-37n-62w; TD 2,130 ft., dry, Converse 1,227 ft., first Leo 1,746 ft., second Leo 1,898 ft.

COLORADO WILDCAT FAILURES

Moffat County, Big Hole: Carter Oil Co. 1 Federal Bank of Wichita, C NW SW 23n-10n-94w; TD 6,188 ft., dry, Tipton Tongue 3,500-4,700 ft., Fort Union 5,480 ft.

Montezuma County: Stateline: Hathaway Bros. 1 Lyon-Fed., NE SW SE 11-37n-20w; TD 7,642 ft., temporarily abandoned, Upper Paradox 5,114 ft., Molas 7,300 ft., Mississippian 7,430 ft.

Morgan County: Carter Oil Co. 1 Morris Sandstead, SW NE NW 1-6n-55w; TD 5,622 ft., dry, Niobrara 4,310 ft., Timpas 4,626 ft., Greenhorn 4,834 ft., "D" sand 5,223 ft., Cloverly 5,435 ft., Morrison 5,560 ft.

Weld County, Keota area: Murphy Corp. and Derby Oil Co. 1 Shable, NE NE NW 5-8n-60w; TD 7,380 ft., dry, Hygiene 3,494 ft., Niobrara 6,197 ft., Ft. Hays 6,442 ft., Carlile 6,502 ft., Graneros 6,817 ft., "D" sand 6,926 ft., "J" sand 7,004 ft., Cloverly 7,264 ft., Morrison 7,346 ft.

UTAH WILDCAT FAILURES

San Juan County, Nokai: Skelly Oil Co. 1 Unit, CW½ SW SE 27-40s-12e; TD 2,578 ft., dry, Shinarump 1,268 ft., Moenkopi 1,383 ft., Cedar Mesa 2,225 ft.

Unitah County, Bonanza: Roy Johason and Watson Oil Co. 2 fee, C S½ NW 34-9s-25e; TD 9,504 ft., temporarily abandoned, Mowray 3,506 ft., Morrison 8,815 ft.

South Ouray: Sun Oil Co. 1 Unit, C NE NE 22-9s-20e; TD 8,457 ft., dry, Green River transition 1,010 ft., Green River 1,744 ft., Wasatch 5,204 ft., Mesaverde 8,120 ft.

Wasatch County, Strawberry reservoir: Carter Oil Co. 1 Jack Burnett, C SW SW 34-4s-11w; TD 10,017 ft., dry, Green River 685 ft., Wasatch 6,120 ft., Fort Union 7,860 ft.

Washington County, Pintura: Sun Oil Co. 1 Unit, C SW SW 33-39s-13w; TD 5,496 ft., dry, Chinle 905, Shinarump 2,550 ft., Moenkopi 2,727 ft., Virgin 4,040 ft., Kaibab 4,498 ft.

WESTERN NEBRASKA WILDCAT FAILURES

Dawes County, NW Big Springs: Plains Exploration Co. and Dunn & Boreing 1 Vance, SE SE SE 15-14n-43w; TD 3,688 ft., dry, Base Ft. Hays 3,055 ft., "D" sand 3,416 ft., "J" sand 3,550 ft.

Garden County: Oshkosh: Pure Oil Co. 1 C. E. Blanchard, SW SW SW 32-16n-43w; TD 5,870 ft., dry, Permian-Triassic 4,146 ft., Cimarron anhydrite 4,697 ft., Pennsylvanian 5,102 ft., Pennsylvanian limestone 5,144 ft., Pennsylvanian sand 5,643 ft., pre-Cambrian 5,820 ft.

NORTH DAKOTA WILDCAT FAILURE

Stutsman County: Barnett Drilling Co., Inc., 1 Gaier Bros., C NW NW 11-14n-67w; TD 4,145 ft., dry, Niobrara 1,450 ft., Greenhorn 1,555 ft., Lakota 2,052 ft., Fuson 2,090 ft., Lakota 2,150 ft., Sundance 2,290 ft., Mississippian 2,420 ft., Lodgepole 2,510 ft., Englewood 2,860 ft., Mantobian Winnipegosan 2,904 ft., Ashern 3,020 ft., Stonewall 3,062 ft., Stoney Mountain 3,125 ft., Red River 3,218 ft., Winnipeg 3,750 ft., sand 3,985 ft., granite 4,140 ft.

SOUTH DAKOTA WILDCAT FAILURE

Fall River County: Cascade Anticline: Lakota Petroleum Co. 1 Houghton, SW SW NE 34-9s-5e; TD 2,528 ft., dry, Granerous 0-131 ft., Dakota 131 ft., Lakota 390 ft., Morrison 610 ft., Unkapapa 825 ft., Sundance 1,000 ft., Spearfish 1,360 ft., Minnekahta 1,545 ft., Opeche 1,595 ft., Minnelusa 1,705 ft.

Eastern Texas

Grayson County Wildcat Shows Oil on Drill Stem

DALLAS.—Reports from Grayson County included one wildcat test which had developed some shows of oil on drill-stem test. The well is Standard Oil Co. of Texas 1 Baker, A. Humes Survey, 3 miles northwest of Sherman. The 70-minute test, from 5,050-5,100 ft. in an unidentified section, recovered 15 ft. of oil and gas-cut mud plus 85 ft. of gas-cut mud. It was drilled ahead following the test.

Other Grayson developments were Shell Oil Co. 1 A. Finston, Big Mineral area, pumped 112 bbl. of oil in 24 hours. Total depth was 3,636 ft.

Standard Oil Co. of Texas 1 Bradshaw, wildcat north of Dorchester in the L. Reed Survey, was running drill-stem test in sand from 7,020-40 ft.

Pure Oil Co. 1 Selz, wildcat east of Tioga, was drilling limestone at 4,496 ft.

The Texas Co. 1 Georgia Cox, second well for the new Oletha field in Limestone County, recovered 30 ft. of distillate, gas, and distillate-cut water cushion and 60 ft. of mud on a test of the Pettit at 7,429-61 ft. Operators were running casing.

Texaco 1 White, Smackover exploration in the Oletha area, cored limestone with gas shows and faint sulfur odor from 11,986-12,035 ft. but apparently did not test and was drilling ahead at 12,060 ft.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Anderson County: Johnson Cone 1 John Caldwell, Scaggs Sur., dry, TD 5,050 ft., Woodbine 4,840 ft.

The Texas Co. 1 J. J. Biggan, D. Parker

Are Your Oil Interests Closely Held or Family Owned?

This bank specializes in oil financing, particularly in connection with closely held or family owned oil and gas producing properties.

Oil and Natural Gas Department

Empire Trust Company
NEW YORK

Downtown Office:
120 BROADWAY
Equitable Building

Uptown Office:
7 W. 51st STREET
at Rockefeller Center

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

Beene-Hurley Use Low Cost Power on Frank's Rig!

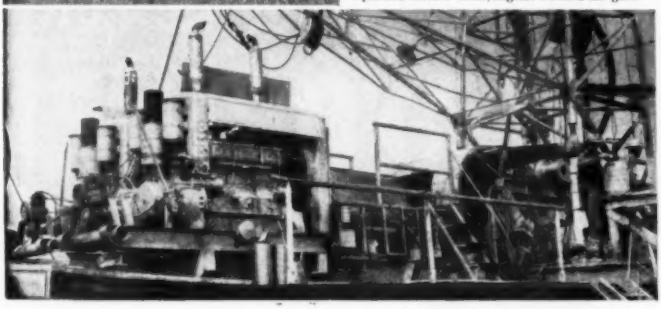
Drillers Beene and Hurley at Bossier City, La., use Frank's portable rig with four Minneapolis-Moline 1210-12A units for power. They are drilling low-cost wells to depths of 6500 feet. The 1210-12A, 12 cylinder unit engines are factory equipped to operate on LP gas or natural gas—the low priced fuels in this area.

Beene and Hurley have mounted two of these units on the drilling table to furnish power to the draw works. These engines are equipped with front power take-off drives and supply 400 hp with LP gas. The other 1210-12A units are remotely located on the mud pump. The complete engineering and installation was done by Beene and Hurley at Shreveport.

This arrangement combines flexibility of layout with important time saving for setting up the rig. Precision tooling and high production methods account for the extremely low selling price of MM heavy-duty oil field power units. Standardization of parts permits interchangeability which assures easier, lower-cost maintenance.

Sales and service of MM oil field engines are handled by the Shrimpton Manufacturing and Supply Co., with branches at Los Angeles, California; Oklahoma City, Oklahoma; and Kilgore, Texas.

Mud pump installation is powered by two MM 1210-12A's.



Two MM 1210-12 on the drilling table operate on low-cost, higher octane LP gas.

THE RIGHT TONG!

FOR SLIM HOLE DRILLING AND WORK-OVER JOBS . . .

BJ's type "WS" extra wide face tong with true bore jaw insures a perfect and safe fit on 2" - 2½" - 3" tubing and couplings. No crimping. BJ quality gives long lasting safety.

A simple plunger knob permits fast roll-over.

BJ has the right tong for every job!

Byron Jackson Co.

MAIN OFFICE & PLANT LOS ANGELES 54, CALIF.

Mid-Continent: Houston 1, Texas

Export: New York 17, New York

BJ MEANS ENGINEERED OIL TOOLS

THIS Solid Carbide Boring Tool is what you need for precision BORING of DEEP, SMALL HOLES

This Bokum tool provides a practical way to bore to greater depths in ratio to diameter. Finish bore often in one pass. More rigidity permits higher speeds without chatter. *Send for Catalog 948.*

Come to Bokum with your **BORING PROBLEMS**

Bokum high-speed steel tools for general boring and threading are distinguished by their helical backed off form, which produces a smooth, clean, precision bore. *Ask for Cat. 1139-6.*

Carbide-tipped boring and internal threading tools. *Cat. 398*

All Bokum tools available in sets in assortments of your own choice. *Cat. Supl. No. 1139-6*

Tool Holders for holding Bokum Boring Tools in lathes and turret lathes. *Cat. 483*

Resharpening fixtures to prolong the long life of Bokum Boring Tools.

For small tools Nos. 00000 to 3. *Cat AB-1* For large tools Nos. 4 to 12. *Cat. AB-4-12*

BOKUM TOOL CO.

SINGLE POINT BORING TOOLS—INTERNAL THREADING, BOTTOMING AND FACING TOOLS—CARBIDE TIPPED TOOLS

DEPT. G • 14775 WILDEMERE AVE. • DETROIT 21, MICH.

Sur., dry, TD 3,750 ft., elev. 298 ft., Woodbine 3,055 ft., Buda 3,150 ft.

Denton County: Ted A. Norwood 1 Bonham, W. C. Whorton Sur., A-1,360, dry, TD 1,960 ft.

Bowie County: Sunray Oil Co. 1 R. E. L. Gray, M. H. James Sur., dry, TD 7,887 ft.

Texas Gulf Coast

Grimes County Gets First Major Oil-Field Discovery

HOUSTON.—The first major oil field for Grimes County has been discovered by Gulf Oil Corp. 1 William Gardner, located 6 miles south of Yarboro. The well flowed at the rate of 142 bbl. of 35.7°-gravity oil daily from the Wilcox at 10,392-10,405 ft. through a 9/64-in. choke under tubing pressure of 900 psi. This is the second oiler for Grimes County. Recently, Woodley Petroleum Co. opened the first oil field for the county at 1 Iris Clark, located 7½ miles northeast of Shiro. The well produced 21 bbl. of oil daily from perforations at 4,688-92 ft.

Lee Brothers Oil Co. 1 Clyde Boothe, wildcat 8 miles north of Mathis, Live Oak County, has opened new gas production. From perforations at 3,270-80 ft., the well flowed 3,140,000 cu. ft. of gas daily on open flow. Shut-in pressure is 1,300 psi. This well is located 3,000 ft. north-northeast of Mount Lucas gas production and is separated from the field by two dry holes.

The Texas Co. has finaled its new pay opener in South Dayton field, Liberty County. The firm's 1 William Duncan Welder et al flowed 254 bbl. of 35.3°-gravity oil daily through perforations at 8,945-47 ft. Tubing pressure registered 1,100 psi. Potential was taken through 10/64-in. choke.

Crews are fishing at 9,600 ft. in Tex-Harvey Oil Co. 1 Robert Winkelmann, Washington County wildcat 4 miles north of Brenham. The well was drilled through the Wilcox and casing set, but no details have been released on where casing was landed. This well is reported to have at least two sand sections that might produce commercially.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Goliad County: New pay at Gladys Powell—Sunray Oil Corp. 1 Mrs. Imogene Ray Hall, Vincente Ramon Sur., A-241, TD 8,433 ft., Luling 7,762-73 ft., IP: 8,000,000 cu. ft. of gas per day, open flow, SIP 2,600 psi.

Jackson County: New pay at Francitas—The Texas Co. 1 Mrs. Ethel M. Beckenhauer, R. D. Moore Sur., A-55, TD 8,000 ft., perf. 7,377-80 ft., IP: 55 bbl. oil per day, 8/64-in. choke, 44.8° gravity, TP 1,075 psi.

Liberty County: New pay at South Dayton—The Texas Co. 1 William Duncan Welder, et al, William Duncan Sur., A-28, TD 10,004 ft., perf. 8,945-47 ft., IP: 254 bbl. oil per day, 10/64-in. choke 35.3° gravity, TP 1,100 psi.

Refugio County: Gas discovery—C. I. Norsworthy, Jr., 1-A T. C. Holeman, Michael Reilly Sur., TD 2,063 ft., perf. 2,048-54 ft., IP: 8,200,000 cu. ft. of gas daily, open flow.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: Dirks Bros. 1 W. B. Tuttle, James Douglas Sur., A-19, dry, TD 5,755 ft.

Brazoria County: John H. Blaffer & Federal Oil & Refining Co. 1 Shell Oil Co., Sec. 28, Stephen F. Austin Sur. 9, A-25, dry, TD 8,528 ft.

Chambers County: Kraftex Enterprises, Ltd., 3 First National Bank of Baytown, Christian Smith Sur., A-22, dry, TD 7,413 ft.

DeWitt County: O. Neathery, Jr., 1 A. Butschek, Roberty Galletty Sur., A-195, dry, TD 9,003 ft.

Galveston County: Sun Oil Co. 1 State Tract 175, East Bay, dry, TD 9,417 ft.

Goliad County: Currie B. Davis 1 Edward Berger, F. Mencha Sur., A-197, dry, TD 5,030 ft.

Grimes County: Placid Oil Co., et al, 1 R. G. Davis, Jr., William Burney Sur., dry, TD 10,526 ft.

Liberty County: Sohio Petroleum Co. 1 Kirby Lumber Co., Hugh Means Sur., A-78, dry, TD 8,575 ft.

Live Oak County: E. B. Grimes 1 C. S. & O. L. Herring, Dr. Simmons Subd., dry, TD 2,397 ft.

Montgomery County: Hagen Hitchfield 1 Harris & Freeman, J. G. Smith Sur., A-539, dry, TD 10,500 ft.

Refugio County: J. R. Butler 1 H. G. Crews, F. Brichta Sur., 5 mi. NE of Tivoli field, dry, TD 5,302 ft.

Victoria County: Stanolind Oil & Gas Co. 1 Agnes West, E. Benavides Sur., A-5, dry, TD 7,500 ft.

Wharton County: Berkshire Oil Co. 1 Guy F. Stovall, Sec. 34, E. C. Ogden Sur., dry, TD 6,533 ft.

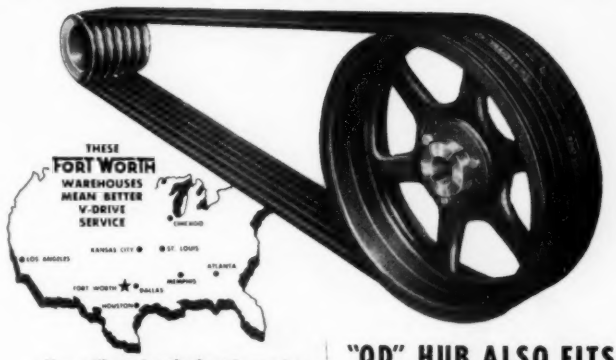
Mississippi

Gas Strike in Northeast Starts Flurry of Activity

JACKSON.—Discovery of a gas-producing area in the northeastern part of Mississippi has created considerable activity, and permit has been let for drilling of a rank wildcat approximately 10 miles west and 1 mile north of the discovery in Clay County. Venture is C. B. Cameron, C. Porter Johnson and John S. Miller 1 Ralph

SEE FOR YOURSELF—Next time try a

FORT WORTH TRANSCO Q D SHEAVE



You will receive the best in service, sheaves, and V-belts when you buy a Fort Worth-Transco V-drive.

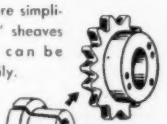
Two manufacturing plants and a large foundry designed to make V-belt sheaves assure volume production even in periods of short supply. Factory warehouses supplemented by numerous stocking distributors provide quick delivery on stock sizes.

The advantages of "QD" construction are many. We will be pleased to explain them to you at any time.

Fort Worth-Transco V-Belts are made for us under our own trade name by B. F. Goodrich in the patented Grommet construction (C, D, and E sizes). A and B sizes are made in the proven "Style 7" construction. All belts are "Double-Matched" to assure long drive life and complete satisfaction.

"QD" HUB ALSO FITS NEW FORT WORTH "QD" Roller Chain Sprocket

Speed changes are simplified and "spare" sheaves and sprockets can be carried more easily.



If your favorite distributor doesn't stock the Fort Worth QD line—both sheaves and sprockets—tell him about them. He'll reward you with better service.

Write for name of nearest distributor and for descriptive catalogs on "QD" Sprockets and Sheaves.

FORT WORTH STEEL AND MACHINERY CO

Dept. 2712, 3600 McCart
FORT WORTH, TEXAS

OTHER FORT WORTH PRODUCTS
ROLLER CHAIN SPROCKETS
SCREW CONVEYORS and ACCESSORIES
SCREW ELEVATORS
INDUSTRIAL FANS

Two New ALTEN UNITS that PUMP SHALLOW WELLS or WATER WELLS . . . . .

The moment you see these units you'll agree with the old saying "The best engineering provides the simplest design."

These units have been stripped of all frills, gadgets, and complex mechanical components . . . they have been engineered for *simplified* operation and they are *priced amazingly low.*

Next time you require a small unit buy an Alten. It will last long in service and keep repair costs cut to the bone.

FASTER, BETTER, AT LESS COST !

• Not entirely new. The limited number put to use for two years in several test areas are giving outstanding service.

ALTEN

- Heavy steel structural parts
- Precision cut and shaved alloy steel gears
- Hardest gear-tooth surfaces
- High quality anti-friction bearings
- Revolutionary new adaptation of single Pitman design prevents overload by bringing bearing and Pitman into perfect alignment.
- Specially designed cable hanger allows quick, easy field changes and adjustments.
- Electric motor mount optional under Samson Post for convenience and compactness.

ASK FOR COMPLETE ALTEN LINE AT YOUR LOCAL SUPPLY STORE

ALTENS FOUNDRY & MACHINE WORKS INC.

LANCASTER, OHIO

Dexter, C SW SW 14-15s-4e. Proposed depth is 6,000 ft. which is believed sufficient to test the Hartselle sand.

While little is known about the state's new gas discovery, Northeast Mississippi Oil Co. 1 Sanders, SW SW SW 22-15s-6e, Monroe County, it seems that the possibilities for large development are good. There are reportedly three shooting crews in the area, and representatives of major companies and various independents are working in several counties surrounding the new discovery.

Lion Oil Co. has secured permit to drill 1 Mary Crawford, C SE NE 23-7n-9e, a deep Lower Cretaceous wildcat in Lincoln County, southwestern Mississippi. The well has a projected depth of 11,300 ft. Drill site is on a block of approximately 5,000 acres, which was assembled about a year ago following the abandonment of Southeastern Drilling Co. and S. P. Borden 1 Marigold A. Boone, which is approximately 2 miles to the southwest of the new venture. The well was drilled to 11,010 ft. with no shows reported. One other test is currently being drilled in this township. Approximately 5 miles to the northwest is Gulf Refining Co. 1 Walker, NW SE 8-7n-9e, which is drilling below 9,613 ft. on an 11,000-ft. contract.

MISSISSIPPI WILDCAT FAILURES

Adams County: B. Serio 1 Frank Fauntleroy et al, 23-7n-2w, dry, TD 6,510 ft.

Franklin County: Placid Oil Co. 1 U.S.A., 17-5n-2e, dry, TD 7,516 ft.

Lincoln County: California Co. 1 Mayo L. Emory, 23-8n-5e, dry, TD 10,652 ft.

Wilkinson County: Gulf Refining Co. 4 Crosby Lumber Co., 30-4n-2w, dry, TD 7,228 ft.

ALABAMA WILDCAT FAILURES

Clarke County: J. L. Duffy & Justiss-Mears 1 C. D. Syphrit et al, 21-6n-4e, dry, TD 5,503 ft.

Covington County: Gulf Refining Co. 1 H. R. Mott, 27-6n-14e, dry, TD 6,023 ft.

Permian Basin

Pennsylvanian Completion Extends Sweetie Peck Field

MIDLAND.—Pennsylvanian production in the Sweetie Peck field has been extended ½ mile southwest into Upton County at G. E. Hall and Hanley Co. 2 Josie Fay Peck, in 20-41-T4S-T&P.

The extension well flowed 468 bbl. of 44°-gravity oil a day through 18/64-in. choke on potential test. Pay was from perforations at 10,416-52 ft.

Sinclair Oil & Gas Co. 6 McElroy, Upton wildcat north of the Wilshire area, prepared to test in the Ellenburger after being delayed by a fishing job. Test was being run to 12,659 ft.

In Midland County, two deep wildcats were testing in the Ellenburger. Greenbrier Oil Co. 1 McAlister was believed to be in the Ellenburger although top on that formation had not been called. A 1-hour test at 12,035-53 ft. recovered 10 ft. of mud, and a second test from 12,050-76 ft. developed half that much with no shows. It was drilling ahead.

Blackwood & Nichols Co. 1 Moss' first test in the Ellenburger at 12,949-90 ft. developed water blanket and mud and cored ahead to 13,015 ft. for another test.

The Texas Co. 1 Bubenik, prospective Pennsylvanian discovery in southwest Tom Green County, was having water trouble. Swabbing produced 11 bbl. of oil and 182 bbl. of water from perforations at 5,462-73 ft., bottom of casing. The section had been squeezed and operators were running electrical surveys.

West of San Angelo, M. H. McKinney 1 M. B. Pulliam drilled plug from casing set at 5,421 ft. and was to treat in open hole to 5,446 ft. Corrected top on the Strawn was 5,407 ft., on ground elevation of 1,943 ft. Earlier, a drill-stem test from 5,437-50 ft. had 1,200 ft. of gas in the pipe and 15 ft. of gas-cut mud with light oil shows.

Pure Oil Co. 1 S. H. Allison, Strawn prospect 11 miles southeast of Sonora in Sutton County, had casing set at 5,125 ft. and was swabbing in open hole to 5,165 ft. Recovery on the swab was said to be oil and gas-cut mud. The section had developed 1,345 ft. of 30°-gravity oil on a 3-hour drill-stem test.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Reagan County: Paul F. Barnhart 1-13 G. T. Patterson, 13-C-L&SV, TD 7,577 ft., elev. 2,678 ft., lower Spraberry 7,235 ft., pay 7,524 ft., IP flowed 360 bbl. 39°-gravity oil, 18/64-in. choke, GOR 610 cu. ft., TP 515 psi.

Lion Oil Co. 1 Ruby, 21-C-L&SV, TD 6,879 ft., elev. 2,690 ft., Spraberry 6,801 ft., IP pumped 125 bbl. 43°-gravity oil, GOR 473 cu. ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Crockett County: Lion Oil Co. 2 Mrs. M. S. Neal, 66-BB-TCRR, dry, TD 5,930 ft., elev. 2,600 ft., Spraberry 5,100 ft.

Schleicher County: Cities Service Oil Co. 1 Hicks, Sec. 2, R. A. Evans Sur., dry, TD 100 ft.

Cities Service 1 E. W. Jones, 3-24-H&TC, dry, TD 930 ft.

K. D. Owens 1 W. C. Jones, 35-24-H&TC, dry, TD 400 ft.

K. H. Owens 1 Ethel Williams, Sec. 1, GC&SF Sur., dry, TD 6,407 ft., elev. 2,237 ft., Strawn 5,836 ft., Ellenburger 6,194 ft.

Tom Green County: Paul C. Teas 1 Jacobs, Sec. 1,130, W. B. Hunter Sur., dry, TD 5,758 ft., elev. 2,140 ft., Canyon 5,651 ft.

TEXAS PANHANDLE (DISTRICT 10)

AMARILLO.—Reported oil shows in a Hale County wildcat have been confirmed by Standard of Texas regarding its 1 Joe Kelichor, old wildcat drilling deeper. A drill-stem test run at 8,510-40 ft., open 1 hour and 20 minutes, had recovery of 19 ft. of slightly oil and gas-cut mud. A second test, open 1 hour at 8,702-30 ft., recovered 20 ft. of oil and heavily gas-cut mud. No pressures were recorded on either test.

Three cores in the interval 8,350-8,540 ft. were alternate streaks of lime and sandy, calcareous shale. The last core had fluorescence throughout its 30 ft. length.

Standard drilled the well several years ago to a depth of 8,010 ft. in the Pennsylvanian, with no shows logged. Recent drilling operations have carried the test to a present depth of 10,410 ft. in granite wash. Oil and gas shows recovered in the drill-stem tests were in Strawn, topped at 8,575 ft.

TEXAS PANHANDLE (DISTRICT 10) WILDCAT FAILURES

Hartley County: Bridwell Oil Co. 1 Houghton, League 202, 20 mi. W Channing, dry, TD 4,464 ft., elev. 3,899 ft., Pennsylvanian 3,143 ft., dolomite 3,500 ft.

Oldham County: Superior Oil Co. 4 Matador, League 330, 3 mi. NE Adrian, dry, TD 7,074 ft. in pre-Cambrian.

SOUTHEASTERN NEW MEXICO

Magnolia Petroleum Co. 1 Black, Lea County Pennsylvanian prospect, swabbed 134 bbl. of load oil in 20 hours then 154 bbl. of new oil in 24 hours with fluid level remaining at 4,000 ft. The section tested was from 11,400-58 ft. Operators prepared to test on perforations at 11,466-11,502 ft.

Magnolia 1 Pope, north of the Denton field, swabbed 20 bbl. of new oil plus 2 bbl. of acid water in 5 hours, from the Devonian at 12,618-60 ft. Further testing will include the section at 12,500-97 ft.

Skelly Oil Co. 9-0 State, which indicated Glorietta production at 6,005-20 ft., had flowing oil from the lower Clear Fork section on drill-stem tests from 8,140-8,320 and 8,328-98 ft. A test was still under way from 8,385-8,500 ft., which had gas at the surface in 30 minutes and mud in 40 minutes.

Skelly made location for a west offset to the 9-0 State, to be the 3-Q State, in SE SE 36-16s-36e, projected to 8,500 ft. as a lower Clear Fork test.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Eddy County: Malco, Resler and Yates 114 State, 25-18s-27e, dry, TD 6,014 ft., elev. 3,555 ft., San Andres 2,091 ft., Delaware 3,285 ft.

C. K. Stout 1 State-Dunigan, 12-19-29e, dry, TD 2,643 ft., elev. 3,360 ft., red sand 2,404 ft.

Southwest Texas

LaReforma Extension Try Drill Stems Good Oil Show

CORPUS CHRISTI.—George E. Wrather Oil Co. and Bass-Vessels have set pipe in 1 Hilaria A. De Garza, wildcat 2 miles north of LaReforma field, Starr County, and are preparing for production tests. On 20-minute drill-stem test at 5,942-51 ft., the well developed 40 psi. working pressure at the surface and recovery was 135 ft. of oil and 30 ft. of oil-cut mud. Bottom-hole flowing pressure was 3330 psi., and shut-in pressure 2,630 psi.

New pay has been established in Jourdanton field, Atascosa County, at Magnolia Petroleum Co. 3 Nixon & Steinle. The well produced 9.22 bbl. of 19.°-gravity oil daily on pump from Queen City sand at 785-93 ft.

Five miles east of McCoy in Atascosa County, B. F. Usery has completed 1 Guy Smith for a good oil discovery. The well made 129 bbl. of 21°-gravity oil daily on pump. Production is from open hole at 2,204½-07 ft. Usery redrilled this well, which was abandoned by Quintana as a dry hole. It is located 800 ft. south of Hedley 1 Muil, which is being swabbed for com-

Combines All The Advantages of "Sealtite" Construction

RUGGEDNESS—ACCURACY—SENSITIVITY

The Clipper "Sealtite"

WEIGHT INDICATOR and DRILLING CONTROL INSTRUMENT

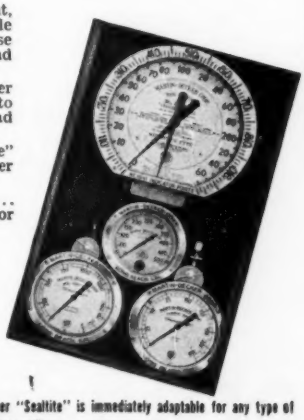
THE CLIPPER "SEALTITE" Weight Indicator and Drilling Control Instrument provides the driller with information on all of the important drilling factors—not just weight alone.

An instrument which reliably shows weight, mud pressure, torque and rotary table speed, assembled in a small compact case for jackknife derricks, folding masts and derricks with limited floor space.

It has all the flexibility of a Toolpusher Model but the gauge is not subjected to the violent whip and vibration of the dead line.

You can install or move a Clipper "Sealtite" just as quickly and easily as a Toolpusher type and it will last much longer.

Made in a wide variety of combinations... there is a Clipper "Sealtite" available for every purpose.



The Clipper "Sealtite" is immediately adaptable for any type of rig, large or small.

- IT'S TOUGH
- IT'S SENSITIVE
- IT'S COMPACT AND COMPLETE
- IT'S MODERN
- IT'S MOVABLE
- IT'S SEALED

HOME OF THE WEIGHT INDICATOR

MARTIN DECKER CORP.

LONG BEACH, CALIFORNIA

SAN JOAQUIN VALLEY: T. J. CULLEN, BAKERSFIELD, CALIFORNIA

MID CONTINENT DISTRIBUTOR: REED ROLLER BIT COMPANY, HOUSTON, TEXAS

CANADIAN DISTRIBUTOR: REED ROLLER BIT COMPANY OF CANADA, LTD., CALGARY & EDMONTON, ALBERTA

pletion attempt. Perforations were affected in 1 Mull at 2,673-80 ft.

Byrd Oil Co. has plugged 1 Blakeley, rediscovery well of Gause field in Milam County. The well produced only 1,200 bbl. of oil since its completion in July of this year. It was originally completed in the Edwards at 5,736-39 ft. Oil output dropped and water increased. Operators deepened 5 ft. and tested 8 ft. of Edwards thus exposed. After 6 hours, recovery was 300 ft. of oil and 2,400 ft. of salt water. Operator then tested the lower Georgetown at 5,711-15 ft., getting only a trace of oil. Gause field was originally discovered by Standard of Texas 1 Lucinda Greene, et al, W. D. Thompson Survey, Abstract 368, in August 1948. The well went off production in December of that year after producing only 629 bbl. of oil.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Atascosa County: New pay at Jourdanton—Magnolia Petroleum Co. 3 Nixon & Steinle, John Neill Sur., A-641, TD 824 ft., Queen City 785-93 ft., IP: 9 bbl. oil per day on pump, 19.3° gravity.

Nueces County: Gas-condensate discovery—Aransas Dock & Channel Co. 1 Aransas Dock & Channel Co., Survey 652, TD 8,650 ft., perf. 7,295-7,311 ft., IP: 210 bbl. of condensate per day plus 7,000,000 cu. ft. of gas, ¼-in. choke.

Atlantic Refining Co. 1 C. J. Horne, Sec. 24, R. de Ynojosa Sur., A-411, TD 10,300 ft., perf. 9,880-9,910 ft., IP: 65 bbl. condensate per day, ¼-in. choke, 50.2° gravity.

Discovery in Red Fish Bay—Atlantic Refining Co. 1 State 411, Red Fish Bay, TD 8,500 ft., perf. 7,147-80 and 7,130-40 ft., IP: 15,000,000 cu. ft. of gas per day, TP 2,468 psi.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Aransas County: Humble Oil & Refining Co. 1 Aransas Bay State Tract 118, 5 mi. N of Rockport, dry, TD 10,125 ft.

Jim Wells County: Paisano Trading Co., Ltd., 1 Otto Schmidt, Sec. 1 Plummer Subd. of Canado Ranch, Sec. 1, Block 1, dry, TD 5,512 ft.

Rhodes Drilling Co., et al, 1 Sarah Brownlee, Alfred townsite, Lot 7, Block 6, dry, TD 3,569 ft.

Kleberg County: C. G. Glasscock 1 State Tract 146, in Laguna Madre Bay, 15 mi. SE of Corpus Christi, dry, TD 8,058 ft.

McMullen County: Bridwell Oil Co. 2 Mabel Brownson, William D. Benham Sur., A-1, dry, TD 4,298 ft.

W. W. Carter 1 J. C. Dolan, H. I. Jacobs Sur. 24, A-616, dry, TD 6,004 ft.

Newman Bros. Drilling Co. and Alaska Steamship Co. G-2 South Texas Syndicate, James Fitzpatrick Sur., A-759, dry, TD 3,995 ft.

Nueces County: Sunray Oil Corp. 1 State Tract 345, USC&GS Sur. 1286, near Red Fish Bay production, dry, TD 9,005 ft.

Brown & Wheeler 1 M. P. Wright, Part of Wright Lands, M. P. Wright Tract, dry, TD 7,524 ft.

Real County: Dan Auld, et al, 1 Hal & Charlie Peterson, GWT&P RR Co. Sur. 49, dry, TD 6,110 ft.

Webb County: Magnolia Petroleum Co. 4 Thos. Hetherington, Seal, Morris & Seale Sur. 491, A-1730, dry, TD 1,065 ft.

Like radar

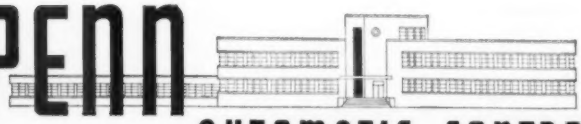
it warns of possible damage to your engine

Vigilant protection . . . 24 hours a day . . . is what PENN Safety Controls give you. At the first hint of excessive water temperature, overheated bearings or oil pressure failure the PENN Control goes into action to prevent damage to your engine!

It will sound an alarm, flash a warning light or stop the engine . . . whichever you choose. This prompt, unfailing action makes it possible to investigate and correct the fault before costly engine damage occurs.

PENN Engine Safety Controls are available in three basic types . . . pressure . . . temperature . . . and combination pressure and temperature. Learn more about this *low-cost protection* for old or new engines. Write for Bulletin E-100. **Penn Electric Switch Co., Goshen, Indiana.** Export Division: 13 E. 40th St., New York 16, N. Y., U.S.A. In Canada: Penn Controls, Ltd., Toronto, Ontario.

PENN



AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, PUMPS, AIR COMPRESSORS, ENGINES, GAS RANGES

Appalachian-Ohio

West Virginia Wildcat Strikes Gas in Chert

PITTSBURGH.—In Union district, Preston County, West Virginia, Cumberland & Allegheny Gas Co. completed 1-464 Clarence Jones, eleveation 1,830 ft., gaging 2,500,000 cu. ft. of gas. The following tops were recorded: Onondaga 4,611 ft., chert 4,651 ft. Gas came in at 4,682-4,721 ft. Total depth was 4,724 ft. In Portland district, Hope Natural Gas Co. 9665 J. Paul Martin, is shut down for repairs at 5,155 ft.; 9673 Nina Kay is drilling at 4,085 ft.; 9676 Sarah J. Creamer at 1,498 ft. In Williamsburg district, Greenbrier County, Deep Rock Oil Corp. 1 Bertha H. Thornbury et al, after a fishing job is drilling again and is at a depth of 3,609 ft. In Gore district, Hampshire County, T. M. Pettigrew et al 1 John Timbrook is drilling at 5,023 ft. after running the 7-in. casing.

Maryland.—In Garrett County, New York State Natural Gas Corp. 2-N-247 John K. Shaw, elevation 2,438 ft., is shut down at 4,007 ft. with gas testing 230,000 cu. ft. The chert was found at 3,790 ft., gas at 3,818 ft., Oriskany sand at 3,904 ft., gas at 3,940 ft., and 3,984-3,990 ft. Blaho Oil & Gas Co. 1 Dorcie Rumer, elevation 2,490 ft., was shot at 3,842-67 ft. in the chert and at 3,940-50 ft. in the Oriskany sand. The gas tests 200,000 cu. ft., but the well will be shot again. Mid Atlantic Oil & Gas Co. 1 Odd Fellows, elevation 2,424 ft., is drilling at 3,767 ft. The chert was at 3,729 ft., gas at 3,762-64 ft. testing 30,000 cu. ft. Delaware Oil & Gas Co. 1 George Perrine, elevation 2,420 ft., reached the Onondaga at 3,677 ft. and is casing at 3,688 ft. Clarksburg Gas Co. 1 T. W. Ashby, elevation 2,391 ft., is drilling at 3,539 ft.; it found the chert at 3,531 ft.

Southwest Pennsylvania.—In Napier Township, Bedford County, South Penn et al-Snee & Eberly 1 Jesse B. Miller, elevation 1,666 ft., is drilling at 8,974 ft. In Unity Township, Westmoreland County, Peoples Natural Gas Co. 1-4003 A. J. Dotterway, elevation 2,094 ft., is below 3,057 ft.

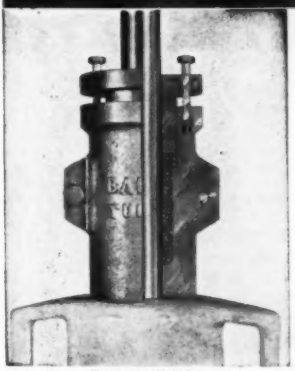
WEST VIRGINIA SUCCESSFUL WILDCAT

Preston County, Union district: Cumberland & Allegheny Gas Co. 1-464 Clarence Jones, 2,500,000 cu. ft. gas, TD 4,724 ft.

OHIO

McCall Drilling Co. has shot 1 L. W. Ogle, Section 18, New Castle Township, Coshocton County, with 60 qt. Production

Polish Rod Lubricator



by
Baird

. . . for wells that head up and flow. Lubricator is packed with shredded graphite, and rests on top of any stuffing box.

Patent applied for

The lubricator built in two pieces does not require a service unit for installation. It also prevents oil spray if the packing lets go.

Available through your supply store

BAIRD MANUFACTURING CO.
P.O. BOX 380-TULSA

Instant Full-Open Relief of Excessive Pressures

KINZBACH MODEL 412
RELIEF VALVE

A dead weight load determines the opening pressure of the Kinzbach Model 412 Hydraulic Relief Valve . . . and when that pressure is reached, the valve opens instantly, providing full-open relief when it's needed most.
It's simple and safe—only two moving assemblies. Test rod permits functional testing at any time. Available for opening pressures from 50 to 1000 p.s.i.

KINZBACH TOOL CO., Inc.
P. O. BOX 277 • HOUSTON, TEXAS

EXPORT OFFICE:
74 Trinity Place,
New York, N. Y.

KINZBACH TOOL CO INC

TO READ MUD LINE PRESSURES

Cameron PRESSURE GAUGE

Cameron Pressure Gauges Are Easy To Read From Across the Derrick Floor

CAMERON IRON WORKS INC.
P. O. BOX 1212 • HOUSTON, TEXAS
EXPORT: 74 TRINITY PLACE, NEW YORK, N. Y.
Represented in sterling area by: British Oilfield Equipment Co., Ltd., Duke's Court, St. James's, London, S.W.1, England

3 proven ways to get L-O-N-G-E-R Thread Life!

Yes sir . . .

24 HOUR SERVICE

on these and many other quality petroleum products! We have branch warehouses in many areas! Call us collect — anytime!

PETROLEUM DISTRIBUTING COMPANY

BOX 203 - HOUSTON, TEXAS - CHarter 5648

Quality Oil Field Lubricating Oils and Greases

increased from 40 bbl. to 150 bbl. per day. Three offsets to the producer have been staked.

In Hopewell Township, Perry County, Section 27, C. H. and D. Co. completed 8 Mary Walser for 50 bbl. after shot. The Clinton was logged at 3,009-18 ft. and made 10 bbl. natural.

Clinton Oil Co., drilling in the older part of the Hopewell Township, Licking County field, found a fair showing of oil in 1 Laura Devore, Section 12. After an 80-qt. shot, the well made 30 bbl. in 24 hours.

Burtner, Morgan & Stevens are drilling a wildcat test on L. V. Gibbs just north of the city of Dover in Dover Township, Tuscarawas County.

Waverly Oil Works has wildcats running on Anna Jenkins in Section 26, Clayton Township, Perry County, and on Albert Zoschneck in Lot 11, Brunswick Township, Medina County.

California

Castaic Area Activity Continues to Expand

LOS ANGELES.—Drilling activity in the Castaic area some 40 miles northwest of Los Angeles continues to expand as more and more operators become involved in the play. Currently an even dozen wildcats or extension attempts are under way. An additional eight rigs are drilling on proved locations.

Bulk of the activity is concentrated near Castaic Junction and particularly at Castaic Hills, where a 4,600-ft. Mohnian oil sand was discovered last September. In 35-5n-17w, Continental Oil Co. was drilling and coring at 5,750 ft. on a west offset to the discovery and Richfield Oil Corp. was below 3,700 ft. on a ¼-mile south extension.

The Texas Co. had two wildcats drilling and coring below 4,600 ft., one located about 1 mile west of the discovery and the other ¾ mile to the southeast. About ½ mile southeast, George Terry 1 Eskridge was drilling below 1,650 ft. North of Castaic Hills 1½ miles, in Section 23, Continental 1 Alexander was nearing 4,300 ft.

In 36-4n-17w, two tests were seeking to extend Newhall-Potrero production eastward. These were General Exploration Co. 10 Ferguson and Union Oil Co. 1 Union-Ferguson. South of the field and at Pico Canyon, in 12-3n-17w, Los Nietos Co. 1 Odeen was nearing 4,000 ft.

At Elk Hills in the San Joaquin Valley region, Standard of California halted drilling at its X-55-30-R after reaching a depth of 12,856 ft., and was preparing to test minor shows encountered in several fractured shale intervals.

CALIFORNIA SUCCESSFUL WILDCATS

Yolo County, ⅝ mile north extension to Winters gas field: Mohawk Petroleum Corp. 1 Winters Comm. 8, SE NE 13-8n-1w, flowed 3,400 M.c.f. through 19/64-in. bean, perforations at 4,770 ft., McCune gas sand 4,770 ft., TD 5,010 ft., elev. 123 ft.

CALIFORNIA UNSUCCESSFUL WILDCATS

Fresno County, Camden area: Caminol Co. 1 Caminol-Coleman, 8-17s-20e, dry, TD 6,540 ft., elev. 212 ft.

Kern County, Belgian Anticline area: Pacific Western Oil Corp. 85-24 Veon., 24-30s-21e, dry, TD 305 ft.

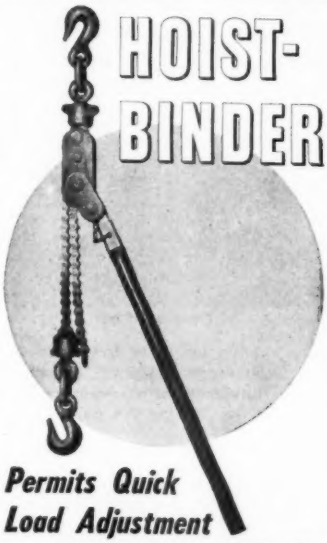
Comanche Point area: Mitchell G. Kovaleski 1-A Flowing Gold, 27-12n-18w, dry, TD 500 ft., elev. 1,016 ft.

Edison area: Golden Gate Pet. Co. & United Explor. Co. of Calif. 1 Mettler, 25-30s-29e, dry, bottomed in Chanac, TD 2,430 ft., elev. 586 ft.

Kern Front area: J. H. Marion 1 Schneider, 2-29s-27e, dry, Chanac 2,308 ft., TD 2,556 ft., elev. 556 ft.

Salt Creek area: Independent Exploration Co. 16 Roco, 18-29s-21e, dry, Point of

NEW RATCHET-TYPE HOIST-BINDER



Permits Quick Load Adjustment . . . Continuous Take-Up

Your load is never "off the hook" when you boom it with a new Coffing Hoist-Binder. Operating on the ratchet hoist principle, the Hoist-Binder pulls load chain to any tension up to 3,000 lb. Takes up or slacks off 20½ in. (or more with longer chain) . . . provides ample length of pull to tighten down springy loads or re-secure those that have settled — without releasing hooks for another bite.

Entire operation — tightening and releasing — is controlled by the handle alone. No buttons to push, no levers to turn. Handle is removable, and when removed, binder becomes a tamper-proof lock. Ratchet and pawl construction holds securely in any position . . . prevents handle from flying up when released . . . permits full strokes for rapid take-up, half strokes for minute adjustment . . . free chains when not under load. The handle acts as a "safety valve," since it will bend before the binder is overloaded beyond safe limits.

Find out more about the binder that gives you extra convenience and safety.

Write for Bulletin F12HB.

COFFING HOIST Company

DANVILLE, ILLINOIS

Quik-Lift Electric Hoists • Hoist-Alls
Safety-Pull Ratchet Lever Hoists
Mighty-Midget Pullers • Spur-Geared Hoists
Differential Chain Hoists • I-Beam Trolleys

Rocks 2,794 ft., TD 2,887 ft., elev. 1,003 ft. Western Pet. Co. 45 Ferguson Western, 30-29s-21e, dry, TD 1,004 ft., elev. 1,000 ft.

Sharktooth area: Seaboard Oil Co. 27-22 Seaboard, 22-28s-28e, dry, TD 3,334 ft., elev. 900 ft.

Los Angeles County, Dry Canyon area: H. P. Oates 1 Oates-Merritt Annex, 35-5n-16w, dry, TD 2,570 ft., elev. 1,620 ft.

Monterey County, San Ardo area: Jergins Oil Co. 249-35 Lannigan, 35-22s-10e, dry, TD 2,804 ft., elev. 654 ft.

San Benito County, Tully Mountain area: The Texas Co. 1 Tully, 21-18s-10e, dry, TD 5,780 ft., elev. 3,408 ft.

San Luis Obispo County, Guadalupe area: Stansbury-Webb 1 Bosse, 18-11n-35w, dry, TD 2,670 ft., elev. 39 ft.

Morro Bay area: M. S. Martin 1 Sousa, 9-30s-11e, dry, TD 710 ft., elev. 42 ft.

Ventura County, Canada Larga area: Union Oil Co. 1 Canet, 9-3n-23w, dry, TD 5,075 ft., elev. 360 ft.

Kansas

Barton County Wildcat Shows for Oil Producer

BARTON County is adding another new producing area, located about 2 miles west of Great Bend in the south central part of the county, where Leon Huff has what appears to be an exceptionally good Lansing-Kansas City lime well at his 1 Shaffer, located in the SE SE SE 23-19-14.

Starting production tests with casing perforated at 3,332-37 ft. and the interval treated with 1,000 gal. of acid, the well kicked off and flowed 28 bbl. in the first 25 minutes. Top of the section is 3,211 ft. (—1,870 ft.). Previously, oil showings also had been found in the Conglomerate section, topped at 3,428 ft. Total depth is 3,505 ft. with casing run to 3,490 ft. in the zone.

Pickrell Drilling Co. is continuing tests at its prospective discovery well, 1 Putnam, SW SW SW 1-17-14, in the Barrett area of northern Barton County. Latest tests are being made with casing perforated at 3,225-33 ft., in the upper part of the Lansing-Kansas City lime section, topped at 3,224 ft. (—1,238 ft.). After acidization with 500 gal., the well swabbed at an average rate of 12½ bbl. of oil per hour. Intervals previously tested were at 3,288-94 ft. and 3,273-84 ft. where the well swabbed at rates of 1½ to 5 bbl. of oil per hour. Hole, drilled to 3,530 ft. in Arbuckle lime, topped at 3,501 ft., has been plugged back to 3,245 ft. Location is a mile southwest of production of the Barrett pool.

Anschutz Drilling Co. 1 Barnes, NE NE SW 25-27-12, a wildcat located more than 3 miles northwest of the Cunningham field and 4 miles northeast of the Chitwood field, in Pratt County, has encountered promising oil showings in the Lansing-Kansas City lime, Mississippian, and Viola formations but has been drilling ahead to its Arbuckle objective. Lansing was topped at 3,608 ft., Mississippian at 4,002 ft., and the Viola at 4,229 ft. Surface elevation is 1,753 ft. Deepening, top of the Simpson section was found at 4,304 ft., and the Simpson sand at 4,324 ft. All these zones, and also the Arbuckle, are productive in the Chitwood field.

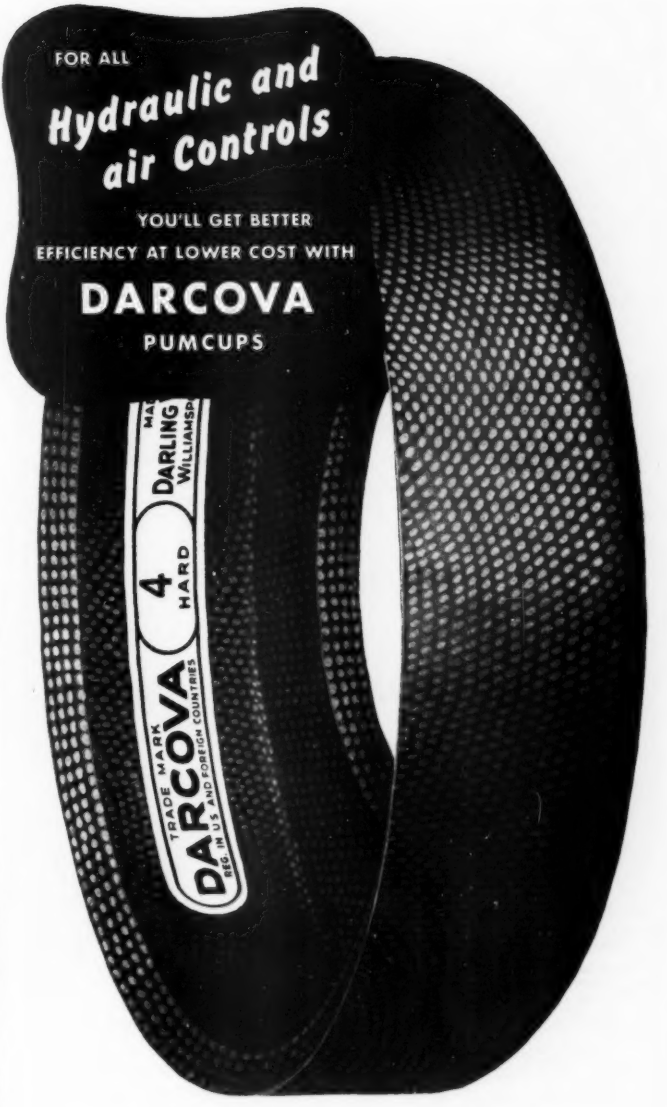
KANSAS SUCCESSFUL WILDCATS

Barton County: Grant Oil Co 1 Harrison, NW NW NW 18-20s-13w, flowed 125 bbl. oil from Arbuckle at 3,519-59 ft., TD.

Ellis County: Francis Oil & Gas Co.1 Fischer, SW SW NW 5-11s-20w, pumped 120 bbl. oil from Arbuckle at 3,680-84 ft., TD.

Graham County: Murfin 1 Morris, SE SE SE 32-7s-22w, pumped 1,068 bbl. oil from Lansing at 3,597-3,600 ft., TD 3,772 ft.

Peel-Hardman 1 Legere, NW NW SE



There's a free bulletin full of reasons and proof. Ask for it today!

DARLING VALVE & MANUFACTURING CO.
WILLIAMSPORT 1, PA.

DARCOVA
THE ORIGINAL COMPOSITION CUP
PUMCUPS

21-8s-23w, pumped 306 bbl. oil from Lansing at 3,761-67 ft. and 3,781-89 ft., TD 4,080 ft.

KANSAS WILDCAT FAILURES

Barber County: National Associated Petroleum 1 Kumburg, NE NE NW 15-30s-12w, dry, TD 4,763 ft.
Pardoe 1 Endered, SE SE SE 25-31s-11w, dry, TD 5,000 ft.
Lion Oil Co. 2 Gentry, SW SW SE 1-33s-15w, dry, TD 5,256 ft.
Barton County: National Associated Petroleum 1 Dahm, NE NE NE 9-20s-12w, dry, TD 3,502 ft.
Francis Oil & Gas and Veeder Supply Co. 1 Logan, SW SW NE 35-16s-14w, dry, TD 3,472 ft.
Butler County: Marhenke et al 1 Stewart, NE NE NE 6-29s-5e, dry, TD 2,928 ft.
Cowley County: Watson 1 Coburn, NW SE NW 8-35s-5e, dry, TD 3,062 ft.
Edwards County: Phillips 1 Fletcher "A," SW SW SW 11-26s-18w, dry, TD 5,140 ft.
Ellis County: Lindas 1 Spilker, SE NE SW 12-13s-20w, dry, TD 3,810 ft.
Okmar 1 Phillips, SE SE NE 19-14s-16w, dry, TD 3,478 ft.
Gove County: Globe 1 Wolfe, NE NE NE 27-12s-31w, dry, TD 4,812 ft.
Graham County: Empire 1 Johnson, NW NW SE 19-6s-25w, dry, TD 4,154 ft.
Peel-Hardman 1 Hanna, NE NE NE 30-10s-24w, dry, TD 4,548 ft.
Ness County: B & R 1 Schearer, SE SE SE 21-17s-25w, dry, TD 4,500 ft.
Phillips County: Sitrin 1 Kats, SE SE NW 20-2s--9w, dry, TD 3,780 ft.
Cities Service 1 Heroneme, NE NE SE 13-4s-20w, dry, TD 3,590 ft.
Reno County: Phillips 1 Barns "A," SW NW SE 12-23s-5w, dry, TD 4,092 ft.
Rice County: Raymond 1 Godschalk, SE SE NW 23-18s-8w, dry, TD 3,302 ft.
Rooks County: Jones-Shelburne & Farmer 1 Renner, SE SE SW 31-9s-20w, Scott County: Amerada 1 Christ, SW SW SW 20-20s-33w, dry, TD 4,900 ft.
Sumner County: National Associated Petroleum 1 Ward, SE SE SW 13-35s-2w, dry, TD 3,517 ft.

By forming a self-healing protective film, small amounts of chromate economically control corrosion in recirculating water and brine systems. This important property of hexavalent chromium salts is constantly broadening their application in the chemical industry. Typical uses are in cooling towers, heat exchangers, condensers, engine and compressor jackets, boilers, and idle equipment.

Write to us of your corrosion problem. Our Research and Development Department will be glad to offer recommendations based upon years of industry-wide experience.

MUTUAL CHEMICAL CO. OF AMERICA
SINCE 1845
REG U S PAT OFF
Mutual
MUTUAL CHEMICAL COMPANY OF AMERICA

Plants at Baltimore and Jersey City • 270 Madison Avenue, New York 16, N. Y.

Oklahoma

Springer Sand Produces In West Doyle District

SPRINGER sand production has been opened on the northwest side of the Doyle field, in what commonly has been called the West Doyle area, in Stephens County. The discovery well, 1 Culbertson, NW SE SE 4-1n-5w, drilled by Dick Wegener, but recently taken over by British American Oil Producing Co., flowed 40 bbl. of oil in the first 2 hours while on 1-in. choke. Placed on ¼-in. choke, it flowed 10 bbl. per hour.

Production is from the Aldredge zone, opposite which casing is perforated at 6,948-72 ft., and 6,982-7,042 ft. Bottom of the casing is 7,780 ft. in hole drilled to 7,912 ft. Previous production in that sector, opened in 1938, has been from Deese sand.

Indications of prolific Springer production also have been given in a deep test being drilled by Phillips Petroleum Co. on the east flank of the main Doyle field. The prospective producer, 1-A Hitchcock, NW SW NE 18-1n-4w, got an oil flow estimated at 80 bbl. per hour during a 60-minute drill-stem test at 5,650-5,775 ft. in the Springer section. Gravity of the oil was 37.1°. Oil was at the top within 30 minutes after the tester was opened. Gas flowed in 7 minutes. Pressure at the start of the test gaged 1,250 psi. and increased to 1,575 psi. Hole is being deepened to its original 8,500-ft. objective.

Sohio Petroleum Co. has what appears to be a good two-zone producer at its 1 Ragsdale, NE NE NW 17-2s-3w, most southeasterly location for the Camp field, Carter County. Perforated in Tussey sand at 4,434-56 ft. and 4,462-68 ft., the well flowed 282 bbl. in 10 hours through tubing. Perforated in the shallower Eason sand at 4,024-36 ft. and 4,039-47 ft., it swabbed at the rate of 7 bbl. per hour. Total depth is 4,650 ft. with casing on bottom.

Production of the rapidly developing Southeast Rich Valley pool, Grant County, is being extended southeastward where Sinclair Oil & Gas Co. got a good oil flow during a drill-stem test at 5,810-19 ft. in the pool's second Wilcox sand pay zone. Tester was open 4 hours with gas flowing within 35 minutes and oil in 60 minutes. Oil production during the 3-hour flowing period was 57 bbl. Gas flow was estimated at 375,000 cu. ft. per day. Recovery in the breakdown was 1,350 ft. Gravity of the oil was 47°. Oil string has been run to the top of the pay at 5,810 ft. The well will be the tenth producer for the pool, which was opened last June. No dry holes have been drilled.

OKLAHOMA SUCCESSFUL WILDCAT

Cleveland County: Mid-Continent 1 Westmier, NE SW SW 26-10n-3w, flowed 401 bbl. oil from Joins at 9,578-94 ft., TD 9,630 ft., new zone in So. Moore.

OKLAHOMA WILDCAT FAILURES

Beckham County: Carter et al 1 State-Taylor, C SW SW 31-9n-21w, dry, TD 10,516 ft.
Caddo County: Jackson 1 Hrbacek, SE NW NE 28-5n-12w, dry, TD 2,220 ft.
Comanche County: Kroeger 1 Burtram, NE NE NE 27-1n-10w, dry, TD 263 ft.
Cotton County: Snoddy 1 Petty et al, NW NW NW 5-3s-11w, dry, TD 1,701 ft.
Creek County: Wilcox Oil 1 Fixico, SW SE NW 21-16n-7e, dry, TD 3,514 ft.
Garfield County: Zephyr Petroleum 1 Boepple, SW SW NE 21-21n-4w, dry, TD 6,781 ft.
Kay County: Colpitt 1 Seltzer, SE SW NE 15-28n-3e, dry, TD 3,123 ft.

Lincoln County: Gulf Coast Western 1 Woody, SW SW NE 22-12n-3e, dry, TD 5,707 ft.
The Texas Co. 1 Retherford, NW NW SW 7-16n-3e, dry, TD 4,950 ft.
Finston 1 Howard, SE SE NW 12-16n-3e, dry, TD 4,800 ft.
McIntosh County: Parker 1 Neff, C NE SE 35-12n-14e, dry, TD 3,420 ft.
Major County: Superior 28-22 Schultz, SE SW SW 22-23n-10w, dry, TD 7,875 ft.
Marshall County: Schumacher 1 Olmstead, SE SW NE 16-5s-5e, dry, TD 427 ft.
Muskogee County: Genzer & Genzer 1 Tindall, NE NE SW 34-14n-15e, dry, TD 2,802 ft.
Noble County: Kingwood Oil 1 Wright, NE SE SW 11-23n-2w, dry, TD 4,509 ft.
Osage County: Lindsay 1 Osage, SW SW NW 34-28n-9e, dry, TD 2,249 ft.
Seminole County: Van Grisso Oil et al 1 Bleeker, NE NE SW 18-10n-8e, dry, TD 3,560 ft.
Stephens County: Stanolind Oil & Gas 1 Lone Star Producing Co., SE NW SW 7-1n-5w, dry, TD 7,803 ft., geological wildcat in No. Cruce

★
Core Analysis
★
Core Sampling Service
★
Diamond Rotary and Cable Tool Core Barrels
★
W. S. (Bill) Burdette
SOUTHWESTERN CORE LABORATORIES
3903 S. Peoria • Tulsa
Phone 7-3766

BARRET
SPECIALIZING IN MAGNETIC SURVEYS
Contracts accepted for domestic and foreign projects, using the most improved instrumental and interpretative technique.
William M. Barret, Inc.
Consulting Geophysicists
GIDDENS-LANE BUILDING
SHREVEPORT, LOUISIANA

North Central Texas

Jack County Gets Prolific Mississippian Oil Discovery

WICHITA FALLS—Week's developments in Jack County included a prolific discovery, a wildcat location, and another, in the testing stage, showing oil.

Rankin & Pitcock completed its 1 Laura Ainsworth as a Mississippian discovery for a daily potential of 1,368 bbl. of 42°-gravity oil. That figure was based on an actual 6-hour flow that averaged 57 bbl. hourly through 30/64-in. choke from pay at 4,300-24 and 4,328-32 ft. Gas-oil ratio was 500 cu. ft. and flowing tubing pressure was 460 psi.

Tom C. Patten Producing Co. 1 J. R. Williams, 12 miles southwest of Jacksboro in the BS&F Survey, A-88, was reported to have developed oil on a drill-stem test at 4,471-97 ft. and continued testing.

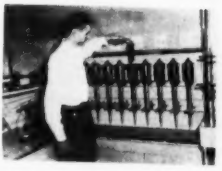
Location for the new test was made by P. M. Barton as the 1 L. D. Williams, ¼ mile northwest of the 1 Williams. Contract depth was not reported.

In Nolan County, Union Oil Co. of California 1 TXL, 10 miles southwest of Sweetwater, swabbed 4 bbl. of fluid an hour for 4 hours, being about half fresh water. It was shut in 3 hours to build up pressure, then opened through ⅜-in. choke making 4 bbl. of oil in 50 minutes then dying. On latest report, the well had been treated through perforations at intervals between 5,158-5,232 ft., swabbed 2 hours, then kicked off and flowed at the rate of 12 bbl. of oil an hour through ⅝-in. choke.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Callahan County: McElroy Ranch Co. 1-B, E. W. McCollum, Sec. 2,190, TE&L Sur., TD 3,256 ft., elev. 1,476 ft., Caddo 3,200 ft., perforated 3,229-35 ft., IP 135 bbl. 43°-gravity oil, 15/64-in. choke, TP 750 psi., GOR 6,652 cu. ft.
Clay County: Armour Properties 3-B Scaling, Sec. 2,694, 2,694, TE&L Sur., TD 4,510 ft., pay 4,440 ft., IP 384 bbl. 42°-gravity oil, 32/64-in. choke, TP 250 psi., GOR 450 cu. ft.
B. L. Wooley 1 E. F. Galloway, 9-A176-Hopkins CSL, TD 6,136 ft., elev. 1,034 ft., perforated 5,986-6,026 ft., IP pumped 52 bbl. 44°-gravity oil.
Eastland County: The Texas Co. 1-B W. H. Groves, Sec. 473, SPRR Sur., TD 3,469 ft., elev. 1,535 ft., Caddo pay 3,448-69 ft., IP pumped 10.8 bbl. 49°-gravity oil.
Haskell County: Burt et al 4 Swenson Bros., 13-1-BBB&C, TD 2,562 ft., Swastika 2,506 ft., IP 351 bbl. 42°-gravity oil in 4 hr., ¾-in. choke, TP 250 psi., GOR 480 cu. ft.
Jack County: F. Kirk Johnson 1 Bettie Allen, Lot 46, Blk. 2, Henderson CSL, TD 4,606 ft., elev. 1,038 ft., pay 4,563 ft., IP 176 bbl. 40°-gravity oil, 16/64-in. choke, TP 200 psi., GOR 532 cu. ft.
Stephens County: Wittmer, Knight & Ewing, 1 O. C. Chalker, Sec. 77, BAL Sur., TD 4,272 ft., elev. 1,270 ft., pay 3,464 ft., IP pumped 13 bbl. 40°-gravity oil.
Wise County: The Blackwell Oil & Gas Co. 1 A. H. Pearson, 43-A603-MEP&P, TD 3,966 ft., elev. 864 ft., Caddo 3,729 ft., pay 3,867 ft., IP pumped 20.5 bbl. 41°-gravity oil, GOR 350 cu. ft.
Young County: Reno Oil Co. 1 Frances L.

PERRAULT
X-TRUDE
THERMO-PLASTIC PIPE
FOR
THE OIL INDUSTRY
THE GAS INDUSTRY
FRESH WATER SYSTEMS
SALT WATER SYSTEMS
"Everything for the Pipeliner"
*
PERRAULT Brothers
1130 NO. BOSTON, TULSA, OKLA. • 5-1103
Export Office:
30 ROCKEFELLER PLAZA
NEW YORK, N.Y.
CIRCLE 6-6260

SECONDARY RECOVERY
MODERN
TECHNICAL CONSULTING
PRODUCTION ENGINEERING
SERVICE, INCLUDING
CORE ANALYSIS
PRESSURE MAINTENANCE WITH GAS OR WATER
REPRESSURING WITH GAS OR WATER
Retort
Inspection

Our Core Analysis Laboratory
SURVEYS
ESTIMATES
DESIGN
INSTALLATION
SUPERVISION
PETROLEUM ENGINEERS
CABLE & STAPLES
WICHITA FALLS, TEXAS

Gregg, Sec. 17, Young CSL, TD 3,988 ft., elev. 1,131 ft., pay 3,980 ft., IP 211.5 bbl. 39°-gravity oil, 22/64-in. choke, TP 95 psi., GOR 640 cu. ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Bridwell Oil Co. and Moran Bros. 1-A Hammond, 46-A56-H. Corzine Sur., dry, TD 3,934 ft.

J. W. Hastings 1 Anna Koester, J. Poitevant Sur., A-226, dry, TD 3,692 ft.

F. Kirk Johnson 1 B. T. Schroeder, 62-4-Clark & Plumb, dry, TD 3,701 ft.

Brown County: J. T. Paulsel 1 George Pugh Land, C. B. Jennings Sur. 353, dry, TD 1,240 ft.

Callahan County: Bay Petroleum Corp. 1 A. A. Williams, Sec. 160, GH&H Sur., dry, TD 1,206 ft., elev. 1,827 ft., Hope sand 1,145 ft.

M. K. Doumani 1 Hatchett, Sec. 24, D&-DAL Sur., dry, TD 2,312 ft., elev. 1,742 ft., Moran sand 2,121 ft.

HB&G Drilling Co. 1 Russell Hart, Sec. 29, BOA Sur., dry, TD 4,412 ft., elev. 1,492 ft., Caddo 3,519 ft., Mississippian 4,164 ft., Ellenburger 4,214 ft.

Mid-Continent Petroleum Corp. 1-A Oscar Rose, Sec. 56, BAL Sur., dry, TD 4,901 ft.

B. B. Orr 1-A J. D. Hamilton, Sec. 45, BBB&C Sur., dry, TD 1,944 ft.

Clay County: L. T. Burns 1 E. Olsen, Blk. 70, Wood CSL, dry, TD 4,151 ft., elev. 971 ft., Bryson lime 3,962 ft.

Coleman County: Athens Oil Co. 1 N. S. Brannon, Sec. 659, S. Sprague Sur., dry, TD 1,837 ft.

J. H. Blackwell 1 L. S. West, Sec. 701, J. H. Barkley Sur., dry, TD 2,405 ft.

D. E. Blackmar 1 J. P. McCord, 305-1-Charles Wilson Sur., dry, TD 3,406 ft.

Richard King, Jr., and Henry Flinn 2 A. C. Sparks, 85-1-GH&H, dry, TD 2,195 ft.

Harry Todd 1 A. Burkett, J. W. Hicks Sur. 265, dry, TD 2,301 ft.

Cooke County: Ada Oil Co. 1 W. W. Rudd, E. Barnes Sur., dry, TD 4,040 ft.

O. D. Clark 1 R. C. Tune, R. Warner Sur., A-1,103, dry, TD 2,506 ft.

H. S. Moss 1 D. C. Beck, G. H. Howard Sur., dry, TD 3,740 ft.

Eastland County: H. M. Kupp 1 R. F. Weddington, Sec. 499, SPRR Sur., dry, TD 4,111 ft., elev. 1,618 ft., Caddo 3,368 ft., Lake 3,536 ft.

Texas Pacific Coal & Oil Co. 1-D Mrs J. W. Allen, Wm. Fields Sur., dry, TD 3,837 ft.

Fisher County: R H K Drilling Co. 1 L. H Burrow, 85-1-H&TC, dry, TD 6,035 ft., elev. 1,923 ft., Ellenburger 5,930 ft.

Haskell County: Horace Coon, Jr., 1 C. C Hutchinson, 22-14-H&TC, dry, TD 6,111 ft., Caddo 5,593 ft.

Pan American Production Co. 1 Minnie Berry, 9-1-R. H. Montgomery Sur., dry, TD 6,123 ft., elev. 1,519 ft., Ellenburger 5,406 ft.

Frank Wood Associates, Inc., 1 Marguerite Morgan, Sec. 4, CMRR Sur., A-2,178 ft., dry, TD 6,011 ft. in the Ellenburger.

Jack County: American Drilling Co. 1 Durham, Sec. 3, G&BN Sur., dry, TD 5,724 ft.

L. T. Burns 1 E. H. Garrett, W. N. Putman Sur., A-465, dry, TD 4,001 ft.

Jones County: W. M. Jarrell 1-A W. T. Davis, 40-15-T&P, dry, TD 2,144 ft.

Youngblood & Foree 1 A. J. Young, D Bustillos Sur. 198, dry, TD 2,098 ft.

Knox County: Stanolind Oil & Gas Co. 1-A Myrtle White, 59-2-D&W, dry, TD 6,175 ft., Canyon 3,633 ft., Caddo 5,569 ft., Mississippian 5,930 ft., Ellenburger 6,070 ft.

Montague County: Harry Bass 1 Milton Crownover, F. Robertson Sur., dry, TD 2,344 ft.

Bolin Oil Co. 1 Pearl Wilton, Thomas Scott Sur., A-661, dry, TD 2,302 ft.

National Associated Petroleum Co. 1 C. T. Maddox, C. C. Hornsby Sur., A-347, dry, TD 5,880 ft.

West Ohio Gas Co. 1 C. F. Phillips, J Burgess Sur., A-29, dry, TD 6,790 ft.

Shackelford County: B. F. Fitzgerald 1 Nail Ranch, Sec. 99, ETRR Sur., dry, TD 1,650 ft.

Schkade Bros. 1 R. A. Elliott, Sec. 50, BAL Sur., dry, TD 1,948 ft.

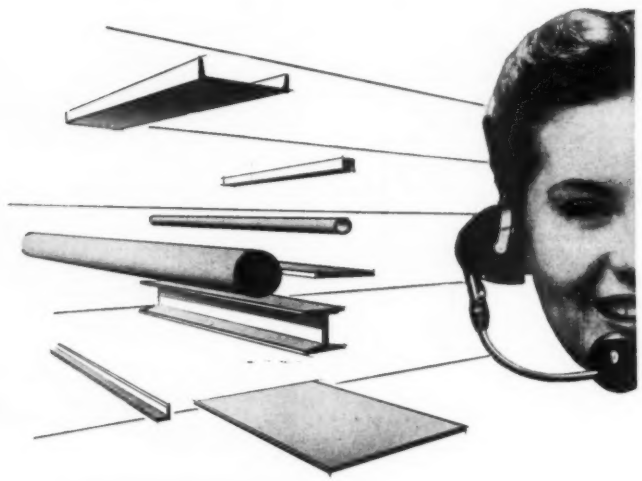
Stephens County: E. J. Briback 1 Jackson Estate, 21-6-T&P, dry, TD 2,217 ft.

Deep Rock Oil Corp. 1 M. C. Phillips, 3-7-T&P, dry, TD 4,220 ft., elev. 1,243 ft., Caddo 3,345 ft.

Taylor County: Hack Drilling Co. 1 Leola Mauldin, 27-16-T&P, dry, TD 2,639 ft.

Ray Oil Corp. 1-B E. L. Young, 266-64-H&TC, dry, TD 4,983 ft., elev. 2,317 ft., Flippen 2,900 ft., reef 3,800 ft.

Young County: Bay Petroleum Corp. 1 J. H Nantz, 6-A29-BBB&C, dry, TD 2,504 ft



STEEL for the Oil Industry

Contact us for all your steel requirements and extend Defense Order Ratings where they apply. Despite current shortages we will do our very best to supply you. And when we have the steel you are assured of prompt, personal service.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled and cold finished
STRUCTURALS—Channels, angles, beams, etc.
PLATES—Many types, including Inland 4-Way Safety Plate
SHEETS—Hot and cold rolled, many types and coatings.
TUBING—Seamless and welded, mechanical and boiler tubes
ALLOYS—Hot rolled, cold finished, heat treated. Also tool steel
STAINLESS—Allegheny bars, plates, sheets, tubes, etc.
BABBITT—Five grades, also Ryertex plastic bearings
MACHINERY & TOOLS—For metal fabrication.

Call RYERSON

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA CINCINNATI • CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE ST. LOUIS • LOS ANGELES • SAN FRANCISCO

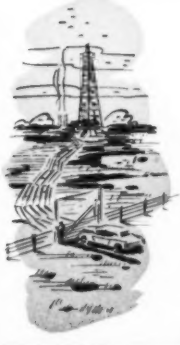
Central Area

MICHIGAN

A Stray sand gas pay that gaged 1,035,000 cu. ft. of gas a day on a drill-stem test was logged at Basin Oil Co., McClure Oil Co. and Swan-King Oil Co. 1 Adair, SE SE NW 13-16n-10w, Green Township wildcat, Mecosta County. Stray sand was logged at 1,304 ft., and gas pay showed to about 1,319 ft. A drill-stem test of this section was run for 50 minutes. Gas started to show in 3 minutes, and best gage, reported above, was made after tool was open for 47 minutes. Wildcat was being drilled ahead towards the Traverse, Dundee-Reed City, zone objectives. On upper markers this wildcat was reported to be checking in from 10 to 11 ft. higher structurally than close-in correlating control points. Wildcat was bound to command top attention, if it held its structural advantage on the Traverse and lower oil objective zones.

Brazos Oil & Gas Co. was running 5-in. casing in the Niagaran at 6,712 ft., total depth, at the HE-1 State Chester, C NE NE 15-20n-2w, Chester Township wildcat, Otsego County. Several possible gas shows and one or more probable pays were cored

The Drilling Contractor's Superintendent

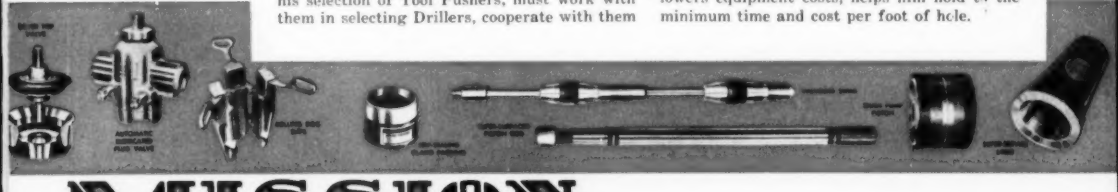


Nearly 90% of the 44,000 wells to be completed this year, will be drilled by Drilling Contractors. Consider the problems to be solved, the complexities to be faced, and the responsibilities involved in so huge a schedule of operations, and you will gain some idea of the importance of the Contractor's chief field officer... the Drilling Superintendent.

A Drilling Superintendent will in some cases supervise fifteen or more drilling rigs representing, in rotary territory, an investment of from 2 to 10 million dollars. He is a drilling expert of long experience.

Since every oil well represents a different and often a unique problem, the Superintendent's job is multiplex. He must be expert in his selection of Tool Pushers, must work with them in selecting Drillers, cooperate with them in planning each well. He must know rigs and equipment, be ready with sound advice on any phase of the job, assist in handling such problems as wild wells, difficult fishing jobs, etc. He must be familiar with the many special organizations offering logging, directional drilling, fishing services, etc.; must understand all completion techniques. In a word, he must be a past master in every phase of well drilling.

Fine equipment is one of the basic factors which enable him to establish a reputation for fast, straight hole. For 25 years MISSION has been one of his valued allies in this department. He has found MISSION equipment unsurpassed in efficiency, dependability, and durability... has found that it reduces hazards, lowers equipment costs, helps him hold to the minimum time and cost per foot of hole.



MISSION MANUFACTURING CO.

Mission Mfg. Co., Houston, Tex. Export 30 Rockefeller Plaza, New York. Europe: London, England

GEARED TO SERVE THE OIL INDUSTRY

Frontier Chemical Company

MANUFACTURERS OF

caustic soda
(FLAKE, SOLID AND LIQUID)

muriatic acid

chlorine

oil well and industrial salt

equipped to deliver . . . without fail!

Ready to roll with 2,700 gallons of liquid caustic soda for one of our contract customers, this husky new truck-trailer rig is typical of the units that make up Frontier's tank truck fleet. You can depend on this kind of equipment to deliver the goods to you . . . where you need them, when you need them.

Dependable transportation is one reason why Frontier Chemical Company has earned its reputation for never letting a regular customer down — even under shortage or emergency conditions. Our production plants are strategically located to serve you, anywhere in the Mid-Continent, Rocky Mountain and Southwestern areas. We stand ready to supply your needs for Prime Quality heavy chemicals . . . caustic soda (liquid, flake and solid), muriatic acid, chlorine, oil well and industrial salt. It will pay you to contract with Frontier . . . now!

FRONTIER CHEMICAL COMPANY

• DELIVERIES WHEN AND WHERE YOU NEED THEM VIA MOTOR TRANSPORT OR TANK CAR

GENERAL OFFICES:
321 WEST DOUGLAS

ELECTRO-CHEMICAL
Frontier Chemical Company
MANUFACTURERS

PHONE 7-5215
WICHITA, KANSAS

Wichita, Kansas • Denver City, Texas • Midland, Texas • Denver, Colorado

in this series, although results of drill-stem tests of the horizon were not too successful. A possible gas pay, with a small oil show, was logged at 5,905-90 ft. Gas shows were reported at 6,310-14 ft., and at 6,540-43 ft. What was described as a possible pay was reported at 6,610-16 ft., where cores showed dolomite, vugs, and fractures.

MICHIGAN WILDCAT FAILURES

Allegan County, Ganges Township: W. D. Gannett' 1 Hutchins, SW NW SE 4-2n-16w, Traverse 1,321 ft., day, TD 1,324 ft.

Overisel Township: Daily Crude Oil Co. 1 Wiersma, NE NW NE 19-4n-14w, Traverse 1,607 ft., dry, TD 1,693 ft.

Valley Township: F. W. Kehlet 1 Engle et al, NW SW NW 31-2n-14w, Traverse 1,299 ft., dry, TD 1,329 ft.

Gladwin County, Tobacco Township: Lakeland Oil Corp. 1 State-Tobacco, NW NW SW 32-17n-1w, Dundee 3,708 ft., dry, TD 4,011 ft.

Iosco County, Oscoda Township: McClure Oil Co. 1 Brownell, NE NE SW 10-24n-9e, Dundee 2,090 ft., dry, TD 2,270 ft.

Montcalm County, Douglass Township: W. R. Swetland 1 Waldron, NE NE NE 21-11n-7w, Dundee 3,300 ft., dry, TD 3,325 ft.

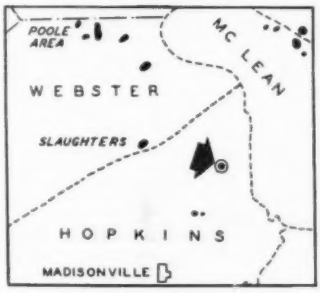
Muskegon County, White River Township: McClure Oil Co. 1 Meinert, SE SW SE 23-12n-18w, Dundee 2,068 ft., dry, TD 2,128 ft.

Otsego County, Chester Township: Brazos Oil & Gas Co. IE-1 State of Michigan, C NW SW 23-29n-2w, dry in Richfield, TD 3,853 ft.

WESTERN KENTUCKY

George Hoffman's and Basin Drilling Co.'s new discovery well in northeastern Hopkins County is being put on the pump after an 8-hour flow in which it made 875 bbl. of clean oil (average more than 109 bbl. per hour). The flow followed a 3,000-gal. acid treatment of its Aux Vases pay zone, opposite which casing is perforated at 2,631-39 ft. Flow, prior to acidization, was at the rate of 360 bbl. per day.

The well, 1 Combes-Ashby, NW NW SW 14-L-26, is the county's first sizable producer. It is in a rank wildcat area, 10 miles northeast of Madisonville, county seat, and 8 miles from the nearest oil production, the Slaughters pool, across the line in



New Hopkins County pool

southern Webster County. McClosky lime, in which hole was drilled to 2,787 ft., also carried oil and gas showings, which have not been tested, except in a drill-stem test.

The same area also is proving productive in Tar Springs sand at another wildcat, located 2,200 ft. south of the above discovery, in the same section. The latter well, Lafitte Co. 2 fee (minerals) is swabbing at the rate of 2½ to 3 bbl. per hour following a 60-qt. nitro shot. Pay zone is at 2,053-70 ft., to which hole was plugged back from a total depth of 2,765 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCATS

McLean County: Sun Oil Co. 1 Hinton, NEc SW SE SE 8-N-25, IP 140 bbl., Waltersburg 1,575-85 ft., TD 1,590 ft. (extension Comer pool).

Webster County: Ralph Halbert 1 Hartford, W½ NW SW SW 5-M-26, IP 180 bbl., Tar Springs 1,976-82 ft., TD 1,982 ft. (discovery well Onton North pool).

WESTERN KENTUCKY WILDCAT FAILURE

Henderson County: H. C. Farmer 1 Strehl, W½ NE SE SW 19-Q-26, dry, TD 2,078 ft.

EASTERN KENTUCKY

ASHLAND.—In Pilot pool, Powell County, J. S. Miller has completed 5 J. S. Abbott for 10 bbl. of oil daily from Corniferous lime at 884-899 ft., total depth. Well is located on White Branch. In same pool Albert Dodge has completed 35 J. B. White Heirs for a 1-bbl. well from Corniferous at 834-944 ft., total depth.

In Johns Creek pool, Floyd County, A. V. Hoenig and Ashland Oil & Refining Co. have completed 3 James Nunnery on Mills Branch of Johns Creek for a pumping potential of 15 bbl. of oil daily from Big Lime (Mississippian) at a total depth of 1,661 ft. Formation was treated with 1,000 gal. of acid.

ILLINOIS

Calvert Drilling, Inc., and associates have an indicated McClosky lime discovery well at their 1 Pictor, SE NW SW 28-5n-10e, a mile east of production of Dundas Consolidated pool, in Richland County. Saturation was logged at 2,873-81 ft., and in a drill-stem test, taking in an interval at 2,869-90 ft., the well flowed gas in 12 minutes and clean oil in 65 minutes. Hole was drilled to 2,965 ft. and casing run through the pay zone to 2,933 ft. Location is just west of the village of Dundas, 8 miles north of Olney.

George & Wrather Drilling Co. and associates have a two-zone discovery producer at their 1 McGrew, NE NE SW 21-2n-6e, 5 miles southwest of Flora, in northern Wayne County. Tested first in McClosky

COMPLETE GEOLOGICAL INFORMATION
at low cost with
Truco DIAMOND BITS
D&S CORE BARRELS
Drilling & Service
3031 Elm Street — Dallas 1, Texas
OFFICE PHONE: Riverside-6811
NIGHT NUMBERS: TRemont-5559, Victor-3708, Dixon-4176

Other Offices-Services	Tyler, Texas.....2-2742	Casper, Wyo.....3739
	Odessa, Texas.....6-6774	Carmi, Ill.....7801
	Abilene, Texas.....2-2790	Ft. Morgan, Colo.....1143
	Victoria, Texas.....3264	Glendive, Mont.....540
	Norman, Okla.....4360	Scottsbluff, Neb.....1793
	Shreveport, La.....5-5474	Hoisington, Kan.....745
Distributors	Diamond Drilling Co., 2759 E. Willow St., Long Beach, Calif., Telephone: Long Beach 40-7949	
	Allied Services, Inc., Mt. Pleasant, Michigan Telephone: 29-861	
Foreign	D. T. O'Connor, 300 Fifth Avenue, New York, N. Y.	
	Petroleum Industry Consultants, C. A., Caracas, Venez.	
	Denton - Spencer Co., Ltd., Calgary, Alberta, Canada.	

THE OIL AND GAS JOURNAL

"Yes, sir—It's that man you said you'd pay a pretty penny to for a lease on his property!"

lime, opposite which casing is perforated at 3,137-40 ft., the well swabbed and flowed

(Continued on page 169)

Canadian Fields

Another Stettler Area Discovery Is Testing

CALGARY.—Canadian Gulf Oil Co. has commenced pump testing at its indicated new pool discovery well in the South Stettler area, about 2 miles south of the company's previous producers in that region.

The indicated new pool oil discovery well is separated from the main portion of Stettler by two dry holes. It found oil in the D2 zone of Devonian, was carried down to D3 but found that lower zone water-loaded and was plugged back for D2 tests.

The well, Gulf 7 C.P.R.-Anderson, in LSD 7 27-37-20w4, completed drilling at 6,250 ft., and was plugged back to 5,280 ft. The D2 section which was fairly tight, but productive of oil, was acidized with 10,000 gal. and given a 200-qt. treatment of nitro. During a 24-hour pump test, 7 Anderson produced 86 bbl. of oil cut 1.6 per cent with water. Gravity of the oil is 30.3°. D2 zone of Devonian at 7 Anderson was contacted at 5,185 ft. or 2,391 ft. subsea.

The Anderson well is Canadian Gulf's fourth Devonian oil discovery well in this general region. The main Devonian oil field at Stettler was discovered by Gulf 4 N. J. Ellis, which is located in LSD 4 10-38-20w4. Big Valley field, south of Stettler, was discovered by the company's Big Valley well, in LSD 7 10-35-20w4. About midway between the 16-mile stretch separating Stettler and Big Valley, Gulf 10 C.P.R.-Gough rated as a Devonian oil discovery in LSD 10 23-36-20w4.

British American Oil Co., Ltd., and Cities Service Petroleum Co. have discovered natural gas at their joint exploratory venture in the Hackett area, about 95 miles northeast of Calgary. The gas discovery well, B.A.-Cities Service 1 Hackett, is located in LSD 13 15-36-18w4, about 10 miles east of Caprona-Fenn area Devonian oil production. Drill-stem tests in the Cretaceous, at 3,809-3,862 ft., gave gas flow rates ranging from 3,780,000 to over 5,000,000 cu. ft. daily. Coring and testing is being continued.

Another natural gas discovery was made in Western Canada during the week, at a venture in the western sector of Saskatchewan, about 50 miles east of the Alberta border. This new gas strike was made in the Dodsland area by an eight-company group headed by Superior Oils of Canada, Ltd.

The discovery well is Superior 2 Dodsland in LSD 11 7-32-20w3, 3½ miles southeast of the group's 1 Dodsland and about 95 miles west-southwest of Saskatoon. The Coleville area heavy crude oil wells are located about 18 miles to the west.

Discovery at 2 Dodsland was made during drill-stem test in the Viking sand interval at 2,201-13 ft. Valve was open for 2¼ hours, and a sustained gas flow rate of 1,100,000 cu. ft. per day was measured during the test. Electrolog has been run, and the Viking sand section showed from 2,197 to 2,218 ft. Hole has been completed at 2,626 ft., and crew is plugging back to the Viking and preparing to set string of 7-in. production casing for completion as a gas well.

Participating in this west central Saskatchewan project are: Superior Oils of Canada, Ltd., Bata Petroleums, Ltd., General Petroleums of Canada, Ltd., Jupiter Oils, Ltd., Kroy Oils, Ltd., Spooner Oils, Ltd., South West Canada Oil Royalties, Ltd., and Altex Oils, Ltd.

CANADIAN SUCCESSFUL WILDCAT

Amerada HF 23-29-Crown, LSD 6 29-27-14w4, TD 3,495 ft., IP 1,250,000 cu. ft. gas daily.

CANADIAN WILDCAT FAILURES

Spooner 1 Target, LSD 8 17-41-22w4, TD 5,822 ft.

Imperial-Home 1 Coal Lake, LSD 15 21-47-23w4, TD 6,120 ft.

McCartney-Leonard 1 Hazard, LSD 4 16-1-14w4, TD 2,946 ft.

Shell 1 Crossfield, LSD 4 22-1w5, TD 11,289 ft.

Britalta-Deep Rock 9 Many Island, LSD 10 20-15-2w4, TD 725 ft.

Bailey 1 Picardville, LSD 4 36-58-1w5, TD 5,400 ft.

Sun-Albercan-Royalite 1 Westside, LSD 16 14-28-1w4, TD 2,987 ft.

Steveville Development 1, LSD 11 19-21-11w4, TD 3,100 ft.

EASTERN CANADA

In the Bruce peninsula of Ontario Bruce Oil & Gas Co., of Detroit, which recently drilled a Trenton lime test near Miller Lake to the granite without establishing commercial production, is planning to undertake additional work in the spring of 1952. Leases are being retained, and further geophysical surveys will be carried out as a guide to additional drilling.

Louisiana-Arkansas

NORTH LOUISIANA WILDCAT FAILURES

Catahoula Parish: Woodward et al. 1 Tarver, 2,050 ft. S and 576 ft. W NEc Sec. 15 in Sec. 40-7n-6e, dry, TD 6,000 ft.

LaSalle Parish: Placid Oil 137 Louisiana Central, 1,980 ft. N and 560 ft. W SEc 19-10n-4e, dry, TD 3,525 ft.

Madison Parish: Gulf Refining 6 Carpenter et al., 1,250 ft. N and 271 ft. E NEc Sec. 35 in Sec. 9-16n-14e, dry, TD 2,600 ft.

Ouachita Parish: Monla Gas et al. 1 Huenefield, 1,029 ft. N and 1,660 ft. W SEc 6-17n-5e, dry, TD 6,333 ft.

THOMAS Flexible ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

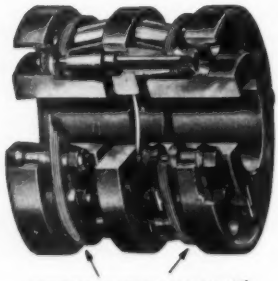
REFINERS! PIPE LINE MEN! DRILLING ENGINEERS! LABORATORY TECHNICIANS!

All can use Thomas Couplings to their advantage on Pumps, Compressors, Cooling Towers, Rigs or any tough job where continuous operation and dependability are required.

Patented Flexible Disc Rings of special steel transmit the power and provide for misalignment and end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes:
½ to 40,000 HP
1 to 30,000 RPM

BACKLASH FRICTION WEAR and CROSS-PULL are eliminated
Lubrication is not required!



PATENTED FLEXIBLE DISC RINGS

THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

• • •

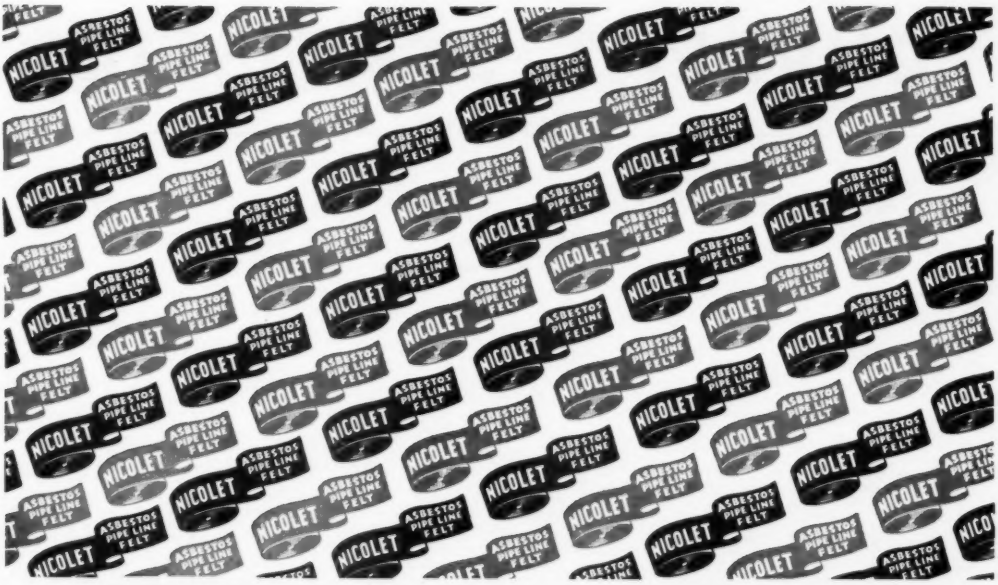
NO MAINTENANCE PROBLEMS.

• • •

ALL PARTS ARE SOLIDLY BOLTED TOGETHER.

Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA



Straps and Supports,
to attach fast...hold fast

Almost every manufactured product or manufacturing process requires that various components be fastened together. Traditional screws and bolts are sometimes undesirably heavy and time consuming in assembly and disassembly. These disadvantages can be overcome with Marman Straps and Supports which use a steel band to surround or support the object to be fastened and a quick easy take up screw to tighten and hold them in place. Lugs and Clips can be easily attached to the Strap or Support allowing it to perform several fastening jobs at once. In this fashion a Strap might be used to fasten a small motor in place and also to support wiring, ducting or fuel lines.

Marman Straps and Supports provide light weight, fast assembly and disassembly, and hold fast under stress and vibration. Chances are you will find they can save you time and money with products under design or in production. We'd like to work with you.

Our catalog explains further... just write dept. J-12

MARMAN PRODUCTS CO. INC.
940 WEST FLORENCE AVENUE
INGLEWOOD, CALIFORNIA

Throughout the **PETROLEUM** *Industry—*

AEROFIN FIN-TYPE HEAT-TRANSFER UNITS do the job Better, Faster, Cheaper

AEROFIN CORPORATION
410 South Geddes St., Syracuse 1, N. Y.

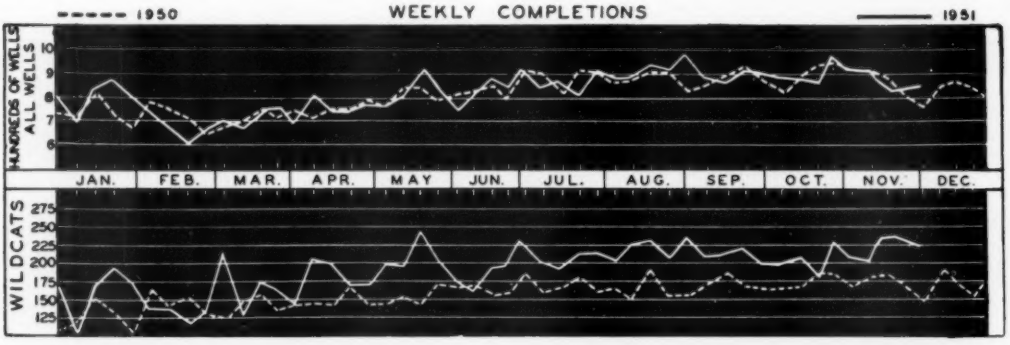
CURRENT STATISTICS

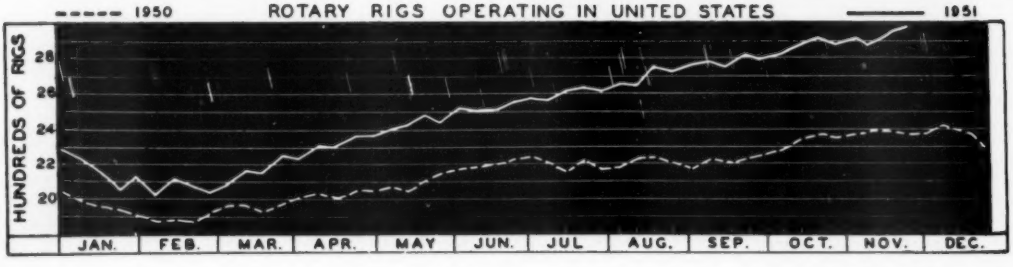
EXPLORATION

WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED DECEMBER 1, 1951

	Total of all wells					Dec. 6		Wildcat completions and discoveries									
													Cumulative total, 1951				
	Comp.	Oil	Gas	Dry	Footage	1951	1950	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	13	7	0	*6	18,210	596	637	0	0	0	0	0	0	0	0	0	0
Pennsylvania	19	5	8	†6	30,838	1,322	1,255	0	0	0	0	0	0	0	2	2	4
West Virginia	11	3	7	1	31,882	571	602	0	0	1	0	1	0	0	8	4	12
Ohio	20	7	6	7	37,738	903	965	0	0	0	0	0	1	0	6	27	34
Indiana	39	13	1	25	65,777	1,264	1,461	1	0	1	8	10	58	0	3	443	504
Kentucky	27	10	2	15	46,351	1,176	1,060	2	0	0	1	3	38	0	2	204	244
Illinois	48	17	0	31	118,987	2,174	2,647	4	0	0	12	16	91	0	0	671	762
Michigan	17	6	0	11	45,823	709	826	0	0	0	8	8	17	0	6	299	322
Kansas	83	39	7	37	290,653	4,051	3,652	4	0	0	21	25	185	1	12	821	1,019
Nebraska	6	3	0	3	26,116	220	118	0	0	0	2	2	17	0	2	109	128
Oklahoma	112	61	2	†49	418,864	5,151	5,028	1	0	0	18	19	171	5	21	682	879
Texas	309	179	16	114	1,464,087	15,282	15,185	15	1	4	75	95	695	52	120	3,190	4,057
North Central (Dist. 7-B & 9)	108	53	0	55	365,905	4,663	4,626	10	0	0	39	49	342	3	17	1,374	1,736
West (Dist. 7-C & 8)	72	60	0	12	386,783	4,639	4,552	2	0	0	6	8	170	10	8	589	777
Panhandle (Dist. 10)	16	9	4	3	60,763	667	827	0	0	0	2	2	2	0	0	31	33
Eastern (Dist. 5 & 6)	17	7	3	7	89,179	1,071	1,062	0	0	0	4	4	9	0	2	214	234
Gulf Coast (Dist. 2 & 3)	55	31	4	20	346,286	2,121	2,134	2	0	2	13	17	89	20	57	443	609
Southwest (Dist. 1 & 4)	41	19	5	17	215,171	2,121	1,984	1	1	2	11	15	83	10	36	539	668
Louisiana	36	16	3	17	239,426	2,006	2,251	0	0	0	7	7	42	10	8	276	336
Northern	19	9	2	8	69,176	1,103	1,210	0	0	0	4	4	15	0	5	163	183
Southern	17	7	1	9	170,250	903	1,041	0	0	0	3	3	27	10	3	113	153
Arkansas	4	2	0	2	17,170	389	377	0	0	0	0	0	15	1	2	78	96
Mississippi	10	1	0	9	62,641	341	286	0	0	0	6	6	14	4	0	139	157
Southeastern States	0	0	0	0	0	46	56	0	0	0	0	0	1	0	0	18	19
Montana	3	2	0	1	5,225	233	246	0	0	0	0	0	0	0	1	41	42
Wyoming	19	8	0	11	99,705	702	556	0	0	0	4	4	15	0	1	103	119
Colorado-Utah	15	6	0	9	92,035	286	101	0	0	0	9	9	9	0	7	130	146
New Mexico	13	9	2	2	65,005	647	562	0	0	0	2	2	13	0	10	74	97
California	44	27	1	16	169,487	2,145	1,668	0	0	1	14	15	54	0	5	432	491
Miscellaneous (No. & So. Dak.)	2	0	0	2	6,673	77	52	0	0	0	2	2	1	0	24	52	77
Total United States	850	421	55	374	3,352,693	40,291	39,591	27	1	7	189	224	1,437	73	240	7,795	9,545
Total previous week	820	391	68	361	3,312,397	....	....	31	0	9	195	235	1,410	72	233	7,606	9,321
Total December 1, 1950	765	425	38	302	2,895,586	....	....	13	2	2	130	147	1,034	70	195	6,019	7,318

Service wells included: *6, †5.





DAILY AVERAGE PRODUCTION FOR WEEK

	Dec. 1 crude oil	B. of M. Nov. demand	Nov. 24 crude oil
Alabama	2,900	2,400	2,800
Arkansas	76,300	85,000	76,450
California	986,200	983,000	985,100
Colorado	78,300	75,000	74,800
Eastern	53,500	61,000	60,000
Florida	1,600	1,600	1,625
Illinois	165,900	161,000	165,000
Indiana	31,400	31,000	31,400
Kansas	315,150	319,000	318,650
Kentucky	35,000	31,000	32,600
Louisiana	601,325	655,000	601,125
North Louisiana	110,700		110,500
South Louisiana	490,625		490,625
Michigan	39,700	40,000	36,300
Mississippi	96,850	104,000	98,950
Montana	25,300	26,000	24,200
Nebraska	7,700	8,000	7,600
New Mexico	149,725	155,000	149,725
Oklahoma	515,700	527,000	511,700
Texas	2,789,000	2,750,000	2,789,000
Dist. 1 (Southwest)	33,300		33,300
Dist. 4 (Southwest)	255,200		255,200
Dist. 2 (Gulf Coast)	166,500		166,500
Dist. 3 (Gulf Coast)	466,675		466,675
Dist. 5 (Eastern)	54,125		54,125
Dist. 6 (Eastern)	121,900		121,900
East Texas field	277,500		277,500
Dist. 7-C (West)	113,750		113,750
Dist. 8 (West)	975,675		975,675
Dist. 7-B (W. Central)	83,175		83,175
Dist. 9 (N. Central)	158,000		158,000
Dist. 10 (Panhandle)	83,200		83,200
Utah	4,100	5,000	3,800
Wyoming	187,100	190,000	183,600
Total United States	*6,162,750	6,210,000	6,154,425
Change from previous week, up 8,325			
Canada	128,460		144,700

Total U. S. production January 1-December 1 †2,055,467,435 bbl.
Same period last year (crude plus cond.) 1,808,674,475 bbl.

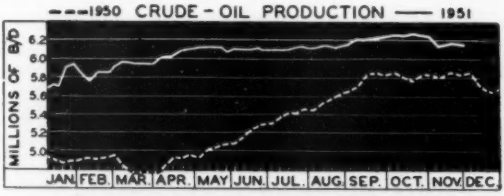
*Not incl. 109,755 bbl. condensate. †Incl. 35,341,110 bbl. condensate.

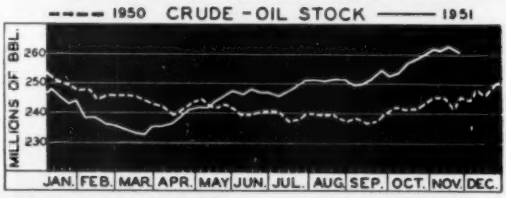
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

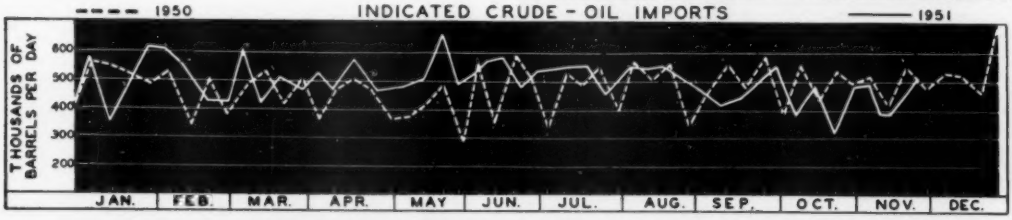
(Thousands of barrels)

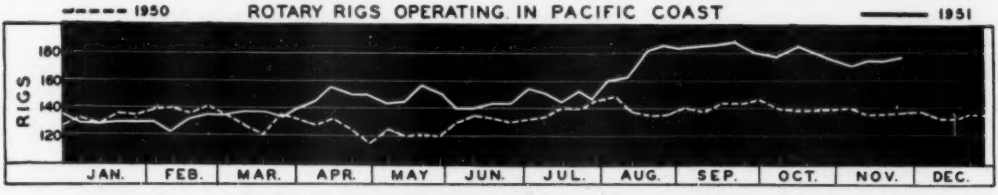
	Nov. 24, 1951	Nov. 17, 1951	Nov. 25, 1950
Pennsylvania Grade	1,932	2,015	2,221
Other Appalachian	1,686	1,621	1,343
Illinois, Indiana, Michigan	12,561	12,533	10,334
Arkansas	2,691	2,734	2,507
Louisiana	14,648	14,609	14,373
North	2,811	2,831	2,801
Gulf	11,837	11,778	11,572
Mississippi	3,581	3,431	2,053
New Mexico	7,184	7,377	6,876
Oklahoma and Kansas	40,825	40,830	38,108
Texas	126,131	128,664	118,440
East Texas	15,660	15,387	13,830
West Texas	54,488	55,108	46,556
Texas Gulf	27,549	28,743	28,711
Other Texas	28,434	29,426	29,343
Rocky Mountain	14,263	14,433	11,398
California	29,004	28,979	30,235
Foreign	5,959	5,894	6,609
Total	260,465	263,120	244,497

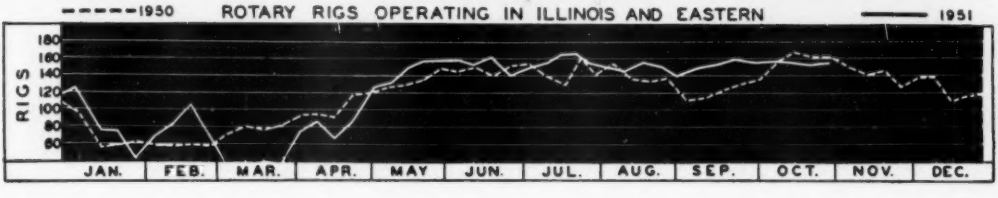
*Bureau of Mines.









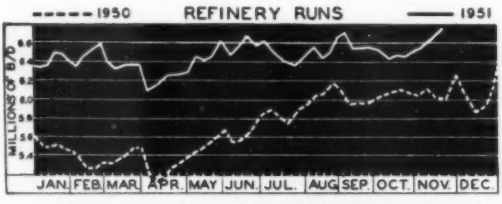


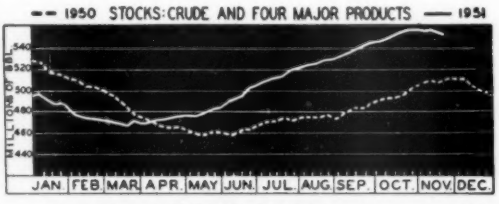
A.P.I. REFINERY REPORT, NOVEMBER 24

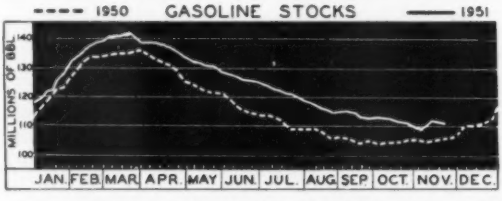
(Thousands of barrels)

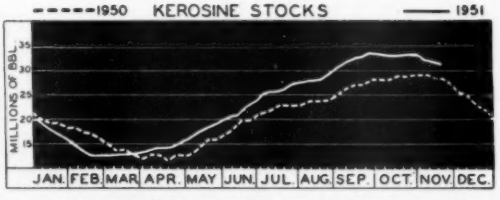
District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, November 1950				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	1,002	404.0	37.9	261.3	221.6	24,461	11,135	34,290	11,296	903	337.6	31.1	232.7	202.4
Appalachian:														
District 1	105	48.3	6.7	14.7	13.3	2,728	549	910	646	103	40.5	6.1	12.9	12.0
District 2	84	35.9	6.6	7.7	19.3	1,129	382	295	279	65	29.9	4.3	6.8	14.4
Ind., Ill., Ky.	1,313	706.7	70.0	233.0	194.4	24,210	6,837	19,931	6,363	1,125	600.0	69.8	187.7	170.2
Okla., Kans., Mo.	542	291.0	18.7	128.2	68.4	11,743	1,796	11,814	2,008	503	276.7	17.2	105.1	60.2
Inland Texas	243	174.4	14.6	39.1	43.7	3,774	608	1,900	1,520	212	151.3	11.8	34.1	40.3
Texas Gulf Coast	1,617	733.8	155.4	350.7	247.9	17,111	5,415	14,731	7,244	1,456	677.2	119.6	337.1	261.3
La. Gulf Coast	535	226.1	72.8	118.4	67.1	6,495	3,381	3,711	2,189	489	221.6	57.3	107.2	62.4
N. La. and Ark.	80	32.9	6.7	16.3	6.6	2,722	654	1,466	109	75	29.3	8.3	17.4	7.6
Rocky Mountain:														
New Mexico	16	8.9		2.9	3.9	112		103	34	13	7.4	.3	2.4	3.2
Other Rocky Mtn.	235	105.0	11.9	37.9	51.3	3,417	354	1,671	960	205	93.5	7.0	38.7	47.2
California	985	401.7	7.6	136.7	391.8	13,796	550	8,164	14,943	936	394.2	9.0	135.6	358.9
November 24, 1951	6,757	3,168.7	408.9	1,346.9	1,329.3	111,698	31,661	98,986	47,591	6,085	2,859.2	341.8	1,217.7	1,240.1
November 17, 1951	6,616	3,159.1	400.3	1,384.0	1,343.3	110,381	32,729	‡100,200	48,434					
November 25, 1950	6,238	2,835.3	340.9	1,227.3	1,210.0	106,424	28,291	86,768	45,566					

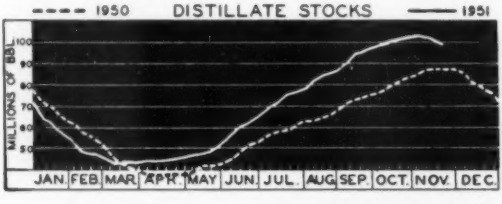
*At refineries including natural blended. †Finished and unfinished. ‡Revised.

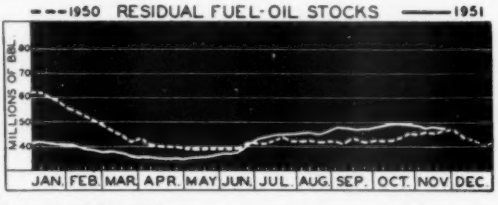


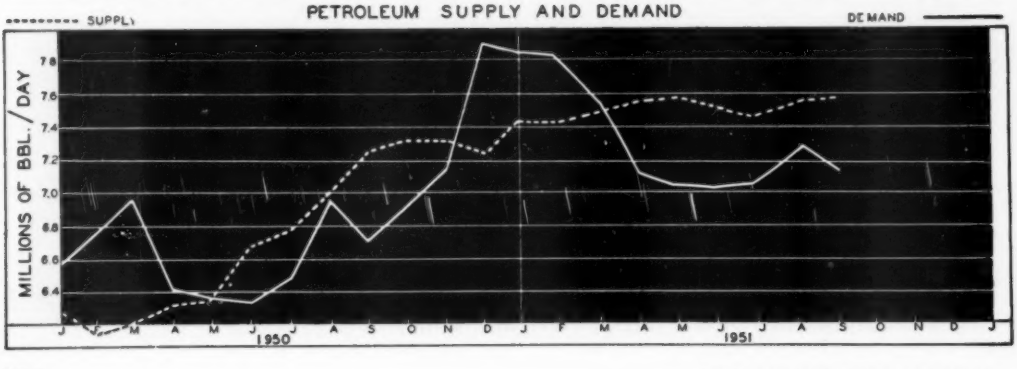












CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Okla-homa, Kansas	Gulf Coast Tex.*	West Texas†
18-18.9	$1.93	....	....	....
19-19.9	1.98	....	....	....
20-20.9	2.03	$2.25	....	$2.12
21-21.9	2.07	2.27	....	2.14
22-22.9	2.12	2.29	....	2.16
23-23.9	2.18	2.31	....	2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

East Texas†	$2.65
Kettleman Hills, California*	2.80
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.33
Bradford, Pennsylvania	4.25
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37-37.9°. †35° and above.

REFINERS established a new all-time record for week ended November 24 with runs climbing to 6,757,000 bbl. daily. The average for the week represents an increase of 141,000 bbl. daily over the previous week and 519,000 bbl. daily over the same week in 1950.

The significant factor in the increase as far as product markets are concerned is the fact that the greatest increase in runs was reported for the district that already has the greatest gain in major product stocks. District 2 runs averaged 1,939,000 bbl. daily, up 66,000 bbl. daily from previous week and 200,000 bbl. daily from same week last year. District 2 stocks are 22 per cent greater than last year.

Shipments of home-heating fuels indicate continuing high demands on the Group 3 area. Most of the reductions in primary inventories have been in northern areas, but orders coming in to Mid-Continent refiners will force stock depletions in that area during the first half of December. Kerosine and distillate prices are very firm with no distress material on the market. The volume of movement by tank cars has reached the point where most spot sales include a discussion on who will furnish the cars.

A higher-than-normal percentage of spot transactions in the New York Harbor area involve exchanges of products rather than outright sales. Increasing tanker rates discourage spot sales since replacement material from the Gulf Coast area will be higher than current spot barge prices in the harbor.

The cost of moving a gallon of No. 2 fuel from the Gulf Coast to New York on a single-voyage charter is about 2.5 cents a gallon. No. 2 fuel costs 8 cents a gallon at Gulf Coast refineries. Quotations for barge delivery in New York Harbor range upward from 9 cents with sales restricted to regular customers.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of December 3, 1951. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10¼-10½	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11¼-11½	13.5-13.75	11¾-12
42-44 w.w. kerosine	9-9⅜	10-10.1	9
No. 2 straw fuel oil	8¼-8½	9-9.25	8
No. 6 residual	$1.65-1.75	$2.45-2.60	$1.75-1.90

NATURAL GASOLINE

	North Group 3	Texas	N. La.
Grade 26-70	6⅞	6⅜	6⅝
Grade 18-55	8.25	7.75	8.0

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29-30
200 vis., No. 3 neutral, 0-10 pp.	17.5-18.5

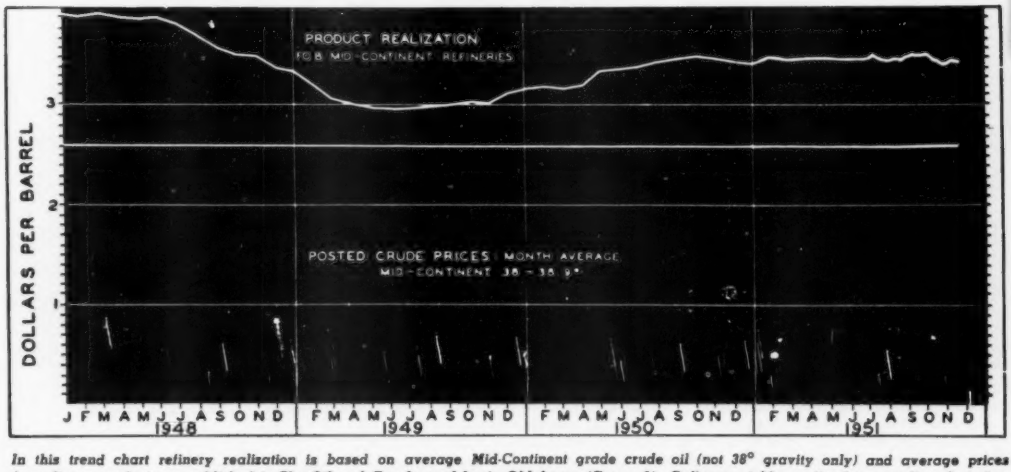
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	33.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	5.5


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
POSTED CRUDE PRICES | MONTH AVERAGE
MID-CONTINENT 38 - 35 °
DOLLARS PER BARREL
3
2
1
J F M A M J J A S O N D
1948
F M A M J J A S O N D
1949
F M A M J J A S O N D
1950
F M A M J J A S O N D
1951

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.46 for week ended November 24, $3.47 for previous week, and $3.50 for November 1950.

EQUIPMENT MEN . . . in the News

Graves Joins PAR Equipment As Chief Engineer

Ernest L. Graves, formerly section head engineer with Standard Oil Co. (Ind.), has joined PAR Equipment, Inc., Tulsa, as chief engineer, it has been announced by D. J. Condit, president.

E. L. GRAVES

Graves, who will specialize in application engineering, received his Bachelor of Science degree in mechanical engineering at Oklahoma University. He subsequently was associated with Shell Pipe Line Co. for 6½ years. He later joined Condit Co. in Tulsa as sales engineer where he served for 2 years.

Graves rejoins Condit in the latter's newly formed organization, PAR Equipment, Inc., after 1 year with Standard of Indiana in Chicago.

PAR Equipment, Inc., was recently organized by Condit to handle distribution, application, and sales of the company's new Shortster side-entering and vertical-type mixers.

Ensign Carburetor Observes Fortieth Anniversary

From small beginnings in 1911 the Ensign Carburetor Co. has expanded yearly until it now comprises an organization of several hundred employes with three factories and markets extending throughout the world.

In celebrating its fortieth anniversary, Ensign is particularly proud of its new Los Angeles assembly plant, just occupied. With these new facilities, in addition to the main factory in Huntington Park and the plant in Chicago, the company is in a better position to meet increased demands for its products.

Orville H. Ensign, founder of the company, was an early pioneer in gasoline and heavy-fuel carburetors for tractors, trucks, and stationary engines, and is credited with many improvements in modern internal-combustion-engine design.

C. E. Hendricks Co. Formed

C. E. Hendricks, formerly a director as well as vice president in charge of engineering at Century Geophysical Corp., has resigned to form his own organization for the maintenance, servicing, and repair of seismograph instruments, and as consultant for engineering problems related to seismology. The new firm will be known as the C. E. Hendricks Co.

C. E. HENDRICKS

Coincidentally with Hendricks' announcement, Midwestern Geophysical Laboratory, Tulsa, advised that Hendricks had been obtained on a retainer basis as a consulting engineer, and also as a seismograph-equipment sales representative.

Waukesha Motor Co. Elects Nelson Director

The board of directors of Waukesha Motor Co. has announced the election of Charles E. Nelson, Jr., as a director of the company.

Nelson, also vice president of production, entered the Waukesha Motor organization in 1929 following several years as state wholesale representative for a major motor-car manufacturer. His earliest activities with the company were connected with the financial department and led to his appointment in 1933 as secretary and treasurer of Fageol Truck & Motor Coach Co. of Oakland, Calif., at that time a subsidiary of Waukesha Motor. In 1934 Nelson was made factory production manager, and in 1936 was made director of purchases and production planning. In 1947 he was appointed assistant to the president, and in February 1949 vice president in charge of production.

Kiekhofer Named Secretary For General American

B. A. Kiekhofer, Milwaukee, assistant to the president and assistant secretary of General American Transportation Corp., was elected secretary of the company, succeeding Maurice J. Feldman, resigned.

Kiekhofer began with Union Refrigerator Transit Co. in January 1921.

Nomads Hold Annual Meeting in Blackstone Hotel, Chicago

The Nomads held their annual luncheon meeting in the main ballroom of the Blackstone Hotel in Chicago during the recent A.P.I. convention. Ed Lorehn of Houston, chairman of the national board of regents of the Nomads, was master of ceremonies, and Jack Berlin of Standard Vacuum Oil Co. of New York was the main speaker. At the speaker's table, presidents and past presidents who attended were, standing: H. B. Book, New York; H. M. Cooley, Tulsa; Ted Sutter and Fred Ripley, Los Angeles; Tom W. Nelson and Harry Estes, Houston. Seated, C. B. McDonald, Houston; Jerry Engstrand, Los Angeles; Courtney Berlin, Dallas; Jack Berlin, New York; E. L. Lorehn, Ray L. Dudley, and R. G. Hamaker, Houston; A. J. Olson, Dallas, and Ken Demarest, New York. Wayne Rives, also a past president, was not available for the picture.

Big Three Dedicates New Plant at Houston

New plant and office building constructed to provide for future expansion.

A 31-year-old dream of Industrialists C. K. Rickel and Harry K. Smith took solid form with the unveiling of Big Three Welding Equipment Co.'s new plant at Houston last October.

J. F. Lincoln, president of Lincoln Electric Co., Cleveland, whose welding equipment has been sold throughout the Southwest for 30 years by Big Three, was principal speaker at the new plant dedication.

The new plant, with nearly 90,000 sq. ft. of working area under one roof, is located on an 8-acre tract lying between the main highway of Eleventh Street and the Southern Pacific Railroad tracks, providing excellent loading and shipping facilities by both rail and motor transport.

According to Smith, Big Three vice president, the main building has an area of 54,856 sq. ft., consisting of a warehouse covering 41,142 sq. ft. and an oxygen plant covering 13,714 sq. ft., with a firewall separating the two areas. Adjacent to the warehouse is the office building with an area of 9,906 sq. ft., with its main entrance on Eleventh Street. The complete, self-contained repair shop, fully equipped to handle the repair and rebuilding of welding equipment, covers an area of 23,977 sq. ft. The carbide and acetylene building cover an additional 1,000 sq. ft.

Big Three currently represents Lincoln Electric Co., Cleveland; Victory Equipment Co., San Francisco; Schramm, Inc., West Chester, Pa.; Cleco Division of Reed Roller Bit Co., Houston; Nelson Stud Welding Division of the Morton Corp., Lorain, Ohio; Ransome Division of Worthington Pump & Machinery Corp., Dunellen, N. J., and many other outstanding firms in the accessory line.

Rickel and Lincoln.

Thomas Associates Locates New Plant at Coffeyville

Thomas Associates, Los Angeles, has established a branch manufacturing plant at Coffeyville, Kans., according to an announcement by H. P. Thomas, general manager. The new plant will produce and stock all volume "TA" clips, clamps, and related items for industrial customers in the midwest area. The new branch plant measures approximately 12,700 sq. ft. Fifty people will be employed. "TA" clamps and clips are made in over 18,000 types and sizes in aluminum, steel, and stainless steel.

Ray Jordan will be plant superintendent, Jack E. Dempsey, office manager, and Bob Walt, service engineer.

Baze to Manage New BS&B West Coast Office

ROSS BAZE

Henry A. Ruysser, Jr., vice president and general sales manager of Black, Sivalls & Bryson, Inc., Kansas City, has announced the opening of a BS&B office at Los Angeles.

Ross Baze, named West Coast sales manager, will be in charge of the Los Angeles sales office, which will handle the complete BS&B line of oil-field products, safety heads, and BS&B Climax controls.

Baze formerly worked with Pacific Telephone & Telegraph Co. as a specification enginer, and also spent 2 years with Sinclair Prairie Oil Co. designing plant layout and facilities. In 1944 Baze joined Hanlon-Waters Co. as service engineer in its South Louisiana district followed with successive promotions to senior salesman and district manager of the territory.

In 1948 Baze was transferred to Tulsa as assistant sales manager of the Climax controls division of Climax Industries. When BS&B purchased Climax Industries, Baze was appointed sales manager of its Climax Control Division.

Bill Lacy, sales engineer, will assist Baze in the Los Angeles sales office.

Dowell Appoints Polk As General Manager

A. C. POLK

A. C. Polk, Jr., assistant manager of Dowell Incorporated, has been named general manager, according to an announcement made by John G. Staudt, executive vice president.

Before his promotion to assistant manager in 1948, Polk was located in the Houston district as district manager. Previous to that he had been with Dowell in Levelland, Tex.; Shreveport, and Lafayette, La.

Prior to joining Dowell in 1941, Polk was active in oil-field work on the Gulf Coast. He has filled every position from roughneck to drilling and production superintendent.

Lane-Wells Names Winter To New Engineering Post

A. B. WINTER

A. B. (Burm) Winter has been made assistant chief electrical engineer for Lane-Wells Co. at Los Angeles.

In his new position Winter will be concerned with specification, design, and completion of electrical phases of Lane-Wells equipment, as well as its acquisition, installation, and maintenance. His duties will also include the investigation of operating problems and recommendation of changes, corrections, inspection, and testing of electrical equipment.

Winter has been with Lane-Wells for 17 years, beginning in 1934 as an electrical technician in the fields at Houston. He was division radioactivity engineer at Houston before gaining his present position in California.

Milo M. Hawthorne will take over the position vacated by Winter at Houston, where he will supervise all division radioactivity equipment and will assist in the selection and training of radioactivity personnel.

Hawthorne came to Lane-Wells in 1947 as a rig man. He worked in the field until 1950 when he became dis-

(Continued on page 168)

CLASSIFIED ADVERTISING

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

DISPLAY CLASSIFIED
$12.00 a column inch one issue . . .
10% Discount three or more issues.

UNDISPLAYED CLASSIFIED 15c a word one issue. 10% Discount three or more consecutive issues. $3.00 minimum charge. Blind Box in our care nine words. Payable in Advance.

EQUIPMENT FOR SALE

FOR SALE: Seamless casing and tubing new and second hand. Phone Rogers Pipe and Supply Co., Tulsa, Okla.

SPUDDERS, BUCYRUS, Wichita, Fort Worth, also rotaries and core drills. Good used equipment, tools, pipe, cable. Everything for well drilling. Fishing tools rented Pressey & Son, Pueblo, Colorado.

WANT TO TRADE: Trailer mounted Rotary, Wilson draw works, 66′ mast, 7¼ x 10 GD Pump. Complete and excellent condition for Rotary suitable for 4000′ drilling or what have you. Box 378, Cherryvale, Kansas.

BUBBLE TOWERS

1—4′ x 44′ x 112# design pressure w/20 trays on 22″ spacing. 1—4′6″ x 57′ x 55# design pressure w/25 trays on 24″ spacing.

NEWMAN'S INC
P.O. Box 1865—Tulsa, Okla.—Phone 2-5228
Immediate Delivery

We Offer
PRESSURE VESSELS
FOR SHIPMENT NOW

USED CONDITION
CODE CONSTRUCTED BY
A. O. SMITH CORP.

8—10′ ID dia. x 40′ tangent to tangent x 3″ shell. Heads 3½″. Test pressure—900 psi. WP—600 psi. All-weld.

8—10′ ID dia. x 40′ tangent to tangent x 2½″ shell. Heads 3″. Test Pressure—750 psi. WP—500 psi. All-weld.

2—8′ ID dia. x 40′ tangent to tangent x 1½″ shell. Heads—1¾″. Test pressure 575 psi. WP—380 psi. All-weld.

8—8′ ID dia. x 40′ tangent to tangent x 2″ shell. Heads 2¼″. Test Pressure 750 psi. WP—500 psi. All-weld.

All vessels located near Chicago, Illinois, and offered subject to prior sale.

Write—Wire or Phone
Howard Kinslow

Kinslow Power & Equipment, Inc.
817 So. Boulder Tulsa 14, Okla.
Phone 5-5914

EQUIPMENT FOR SALE

FOR SALE: U-15 rotary rig in first-class condition. Has 3 NKU Waukesha motors with less than 1 year service. About 6,000 ft. Grade E drill pipe. No mast. New 16″ pump. Located at Okla. City. $92,000. Altus Drilling Co., Okla. City. 3-2331.

WILSON Giant draw works General Motors Twin 12103, excellent condition, located Great Bend, Kansas, price $15,000.00. Charles Spitzfaden, Box 2001, Wichita, Kansas.

83—6″ & 8″ T's & L's. 3 Reducers. 1—10″ L. Crane 125# cast, flange. Used, clean, new condition. ⅓ off net price. C. Pierce, 2436 Clinton Ave., Minneapolis 4, Minn.

Gaso Duplex 4½″ x 6″ Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

SPECO TOOL COMPANY

List your oilfield equipment with us. For trade or sale.
We buy and sell all types of used oilfield equipment.
Oil Field Maintenance & Repair Machine Shops.

Texas represenetative—James Geurin
3809-33st. Lubbock, Texas
Phone 38711

Salem, Ill. Phone 915
Crossville, Ill. Phone 841

EQUIPMENT FOR SALE

USED rotary and cable tool drilling tools, wire lines, E. A. Kelly, Box 861, Oklahoma City. Phone 5-6407.

PIPE: Casing, line pipe and tubing. Pumping units, gasoline engines, electric motors, and oil field equipment. Tulsa Supply Company, Box 294, Tulsa, Oklahoma.

2″ NEW STANDARD BLACK PIPE

12,000 feet T & C
45,000 feet—Plain end
Single and Double Random Lengths

2,000 feet
New 26″ O.D. .281 wall
40 foot lengths

NEW TUBING

4″ O.D.—12 gauge wall
Asphalt coated, pressure tested
40 foot lengths
29,500 feet available

Write—Wire—Phone

SONKEN-GALAMBA CORPORATION
2nd and Riverview (X-789)
Kansas City 18, Kansas
THatcher 9243

INVENTORY CLOSE-OUT SALE

GOOD USED LAPWELD CASING AND TUBING

50,000′ 2⅜″ O.D. 4# TUBING
20,000′ 5½″ O.D. 14# CASING
30,000′ 7″ O.D. 17# CASING
8,000′ 8⅝″ O.D. 24# CASING

LINE PIPE

32,000′ 20″ O.D. x .281″ Wall 59# Used Electric Weld, Plain Ends
1,900′ 26″ O.D. x .281′ Wall 77.5# New Electric Weld, 40′ Lengths
22,000′ 30″ O.D. x .500″ Wall 167# New Electric Weld, 40′ Lengths
5,000′ 36″ O.D. x .250″ Wall 63.5# Good Used Riveted Pipe (suitable for low pressure discharge line or culvert pipe)

MANY OTHER SIZES AT LOW PRICES

IMMEDIATE DELIVERY—SUBJECT TO PRIOR SALE

WIRE OR PHONE AT ONCE

A. J. STRUBEL, Broker
4946 Murdoch, St. Louis Mo. SIdney 1791 (Day Phone) HUdson 8152 (Night Phone)

EQUIPMENT FOR SALE

FOR SALE: 36-L Bucyrus-Erie in excellent condition with or without tools. Casing as follows: 700'—12" I.D., 600'—10" I.D., 900'—8" I.D., 1800'—6⅝" I.D. Or would be interested in drilling contract—would take small interest. Send particulars to: Herman Sill, R.F.D. #3, Box 63, Joplin, Missouri.

SPUDDER BARGAINS!
Cardwell RLGMD, Butane, slick, clean, complete with three strings tools, $20,000.00. Cardwell RLBUD, Diesel, less tools, $16,000.00. Both with 55 foot double poles, both late postwar models, both absolutely A-1 every respect. Will finance two-thirds either or both. Mid-East, Box 253, Fairfield, Illinois.

FOR SALE: No. 3-A-6 National Drilling Machine with 56'—10" shear poles Power Young Drilling motor all in excellent condition. Tulsa Ph. 4-2889 or write Box E-471, The Oil and Gas Journal, Tulsa, Oklahoma.

2318' Good seamless Pipe 74 Joints, 7" O.D. 23#, 8 R. Thread, Collars. $3.52 Per ft. Located West Central Texas. Phone WE 6227, Box 1512, Dallas.

PIPE
All sizes; line pipe and casing, tanks, and Oilfield supplies. Edco Pipe & Supply Co., Phone 98434, Tulsa, Oklahoma.

EQUIPMENT FOR SALE: One U.O.P. center wall up draft heater, two pass arrangement, containing 27 3¾" x 3" x 40' convection tubes, 4 3½" x 2¾" x 40' shock tubes, 7 3½" x 2¾" x 40' hip tubes, and 22 3½" x 2¾" x 40' radiant tubes in each pass, all tubes 7% chrome ½% moly. Unit is complete with tubes, headers, steel work, refractory stock, and breaching, dismantled and ready for shipment. American Liberty Oil Company, Box 1011, Mt. Pleasant, Texas.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

IMMEDIATE SHIPMENT

FILTERS

36" Filter Press, open delivery, 27 chambers, wood plates.
30" Sperry, Type 47, 26 frames, hydraulic closure.
8' x 12' Feinc, all steel.
8' x 10' Oliver, wood and steel. (3)
11'6" x 18' Oliver, all steel.
#7 Sweetland, 2" spacing, 27 leaves available.

→SEND FOR OUR BROCHURE←

HEAT & POWER CO., INC.
70 Pine St., Hanover 2-4890, New York 5
Machinery & Equipment Merchants

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

FOR SALE: Two 3000 bbl. Butler bolted tanks good condition. Can ship immediately. Wentz Fuel Oil Company, 1012 No. 16th St., Lincoln, Nebraska.

LIGHT PLANTS: New and rebuilt. Witte & Shepherd. Diesel Light Plants, 5 to 15 KW, A. C. 60 Cycles, 110-120 Volts. Single or 3 Phase. Priced to sell. Irick Electric Co., Inc., Box 928, Gallup, New Mexico.

KEYSTONE spudder, trailer mounted, truck and tools. Located Washington County, Oklahoma. Working on seven hundred foot well. Box E-385, The Oil and Gas Journal, Tulsa, Oklahoma.

ROTARY MUD PUMP: 6 X 16 Oilwell, good condition, recently overhauled, subject your inspection. $6500.00. Write Howse Drilling Company, 208 Grant Bldg., Abilene, Texas. Phone 2-3780.

FOR SALE: One super model Wilson single drum servicing unit, 80 hp. Waukesha 1,000' wire, all tubing tools, mounted on GM 4-wheel drive truck. $3500. Phone Rogers Pipe and Supply Co., Tulsa, Okla.

17,000 FEET—1¼ inch seamless tubing at 55c. Barron-Steele Oil Co., 2485 McFaddin St., Phone 42392, Beaumont, Texas.

FOR SALE: One Bucyrus-Erie 36 L Spudder three and one-half years old. Complete top and bottom tools 15½ to 5½. Also complete tailing in tools. All in first-class condition. List on request. J. E. Griggs, 310 East Third St., Mt. Carmel, Illinois. Phone 959.

FOR SALE: 87 ft. telescoping rotary drilling mast complete with steel sub base. Terms. Melton Supply Company, Seminole, Oklahoma.

FOR SALE: In the Chase-Russell, Kansas area three 94' angle iron rotary drilling derricks standing. Cities Service Oil Company, Patridge, Bartlesville, Okla.

GASOLINE Engine, Continental, 170 HP., 2400 RPM, R6602, unused, reduction gear, 12 volt, cheap. Air Compressor, Le Roi 105 ft. like new, on GMC Truck, compartments. Box E-500, The Oil and Gas Journal, Tulsa, Okla.

USED PIPE

5,200' 5½" O.D. 14# 8 Rd. R2 & 3 J No. 1 used seamless casing
3,300' 2⅜" O.D. 4.7# 8R R2 J No. 1 used seamless tubing

FRANK MORRIS AND CO.
424 So. Cheyenne Tulsa, Oklahoma Phone 28248

EQUIPMENT FOR SALE

SLIGHTLY USED: 1—Model T-380 7½"-X 12" Clark Ideco Triplex Slush Pump, 380 H.P., 800# P.S.I., 805 GPM at 65 S.P.M., Fluid End 3500# WP Suction 1500# WP, Wt. 30500#. Excellent Condition. Price F.O.B. Odessa, Texas, $8500.00. H. A. McCarthy, 310 Thompson Bldg., Tulsa, Okla.

FOR SALE: Westcott, Foxboro and Emco Gas Meters. Geo. R. Milner, Box, 124, Okmulgee, Oklahoma.

PIPE threading machines. One—3½" to 7". One—6" to 14". Complete with 10 HP electric motors, switches, and dies. Excellent condition. Will sacrifice price for quick sale. See at Western Construction Co., Hobbs, N. M. Phone 3-4134.

FOR SALE: 16,000' 4" o.d. 6.2 lb. and 6000' 3½" seamless line pipe. Random lengths 35 to 40'. Straight, clean, beveled, stood 2200 lbs. hydrostatic test. Price 75c & 60c f.o.b. our yard, Coffeyville, Kans. M. J. Regan, Phones 448 & 3892.

EQUIPMENT WANTED

WANTED: R. or R.L. Cardwell double drum spudder in good condition capable of working to 7,000'. Box E-497, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Franks-4500 or 5000 Portable rig. Skid-mounted or trailer-mounted. With drilling accessories and with or without mud pump and drill pipe. Contact P. O. Box 1022, Del Rio, Texas.

WANTED: Lee C. Moore 87' mast and sub base complete. Have 66' trailer mounted mast for sale or trade. Box 378, Cherryvale, Kansas.

WE BUY well drilling equipment, machines, cable tools, pipe, etc. Turn your surplus equipment into cash. Pressey & Son, Pueblo, Colorado.

2⅞" I. F. drill pipe Range 1 and 2 with tool joints. 4¾" or 5" drill collars Range 2, 4½" light weight casing elevators. Contact P. O. Box 730, Bartlesville, Okla.

WANTED: Triplex Type Pumps, minimum 500 barrels per day capacity at 1,000 PSI and 0 to 10 PSI suction and up. 1" Regular Black Line Pipe; 1" long collar line pipe and 1¼" upset tubing. Must be in good condition. Lynch Oil Company, P. O. Box 814, Evansville, Indiana.

Wanted for export used
THERMO CRACKING PLANT.
Parts or complete
Capacity approx. 2000 Barrels per day.
Write to:
THE FORAM CORPORATION
76 Beaver St., New York 5, N. Y.

WANTED FOR CASH

Oil Well Type Motors in ratings 15/30-20/50-25/65 or 35/75 Horsepower. Will buy other type motors.

ALLIED ELECTRIC & MACHINERY CO.
1007 Falls Bldg., P.O. Box 1138
Memphis 1, Tenn.

WANTED—GOOD USED DRILLING EQUIPMENT

1—Triple Lee C. Moore, or similar, drilling mast with 7 foot substructure
1—150 ton BJ, or similar, hook
1—150 ton swivel
1—4 sheave 150 ton traveling block grooved for 1⅛" line
1—4¼" x 40' square Kelly
1—13⅜" Shaffer type 39 or 40 double B.O.P.
1—Link belt, or similar, shale shaker

GEHRING EQUIPMENT COMPANY
P.O. Box 2290 Casper, Wyoming

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing. Catalog and Samples on request. Burkhart Printing & Stationary Company, 115 South Cincinnati, Tulsa, Oklahoma.

EQUIPMENT FOR SALE

Model FXZ Gardner-Denver 7¼ x 12 mud pump. Complete mounted on skids. This pump has been completely overhauled and $2100 of new parts installed. Location: Mountain Iron & Supply Co., Plainville, Kansas.

Lee C. Moore S. H. Cantilever Mast with 5-sheave crown block, 45 ft. long base, racking board, catline sheave and extension brackets. This is a 127 ft. mast and can be converted to 97 ft. Location: Mountain Iron & Supply Co., Great Bend, Kansas.

1937 Chevrolet 1½ ton truck with long wheel base and flat bed, good rubber. Many miles of service left in this vehicle. Make us an offer.

1947 Ford Tractor with solid bed trailer. Can be had for a song. Location: Mountain Iron & Supply Co., Great Bend, Kansas.

1950 International 1½ ton pick-up truck with long wheel base. Excellent condition with nearly new rubber. Less than 15,000 miles. Our price on this truck is very reasonable.

$105 Jaefer 2 sack cement mixer with Hercules power on steel wheels.

1HC TD-40 Bulldozer. Six cylinder, 65 H.P. in excellent condition.

CALL, WRITE, OR WIRE

THE MOUNTAIN IRON & SUPPLY COMPANY
PHONE: 7-4238 **FOURTH NATIONAL BANK BUILDING**
WICHITA, KANSAS

BUSINESS OPPORTUNITIES

COMPLETE Record keeping, Machinery and equipment inventories. Payrolls, reports within 500 miles of Tulsa office. Replies confidential. Box E-481, The Oil and Gas Journal, Tulsa, Oklahoma.

THREE Drive In Theaters, $350,000.00. Terms. Sound Investment. Will Stand very Closest investigation. Southwest Texas. Reason for Selling, old Roughneck retiring. Made his. Box E-468, The Oil and Gas Journal, Tulsa, Oklahoma.

HORSE TRAINERS HANDBOOK — tells everything about horses. Price $5.00. We sell certified double veterinary checked race horses. Horsemans Supplies, Box 57-J, Manteno, Ill.

MANUFACTURERS representative desires additional line for oil industry. Well established coverage of Oklahoma, Kansas and North Texas. Box E-486, The Oil and Gas Journal, Tulsa, Oklahoma.

TO OIL TOOL MANUFACTURERS

REVOLUTIONARY ROCK BIT: Perfected ready for production, need Manufacturing Company with large production capacity, will demonstrate that it will equal or exceed (sometimes 100% faster), than any known method of making hole. One single type of bit will drill all types of formations, including live blue granite. Will make deal for exclusive rights to the manufacture and sales. Box E-493, The Oil and Gas Journal, Tulsa, Oklahoma.

REAL ESTATE

FOR RENT: Warehouse and storage yard, Lafayette, La., on O.S.T. 90 and railroad. 200 x 700 enclosed with Hurricane fence. Hard surfaced driveways. Mike Donlon, Lafayette, La.

HOTEL well equipped, modern, 3 story brick, 42 rooms, 18 with baths, doing good business, located in college town, ranch and farm community. L. C. Larson & Son, Chadron, Nebraska.

FOR SALE—MAPS

NORTH DAKOTA and South Dakota Base Maps—County outline, Township and Range, location of wells and Operators name with total depths. Oil and Gas Fields. 1" = 8 miles. Price $5.00 each. County Maps: Fee ownership and lease with expiration dates. Scale 1" = 4,000 ft. Northwest Mapping Co., 117½ Fourth St., Bismarck, North Dakota.

LEASE SERVICE

RECORD TAKE-OFF, available. Listing all Oil leases and assignments as recorded in Grant County, at Carson, North Dakota Giving complete information. Also monthly continuations made. Write P. O. Box 344 Carson, North Dakota.

RANCHES and FARM LANDS

Colo. Mt. Ranch

One of those hard-to-find spreads: 600 acres deeded; 320 acres state lease; 1700 acres Taylor right. Hay meadows put up 500 to 600 tons hay. A two bedroom home in excellent condition, 2-car garage; bunk house; shop; corrals. Will carry 250 head year round. Has 140 head Forest permit. In fine hunting and fishing area in choice Colorado area. Write, wire or phone up immediately for full facts.

WESTERN Realty Co.
REALTORS
C. A. (Chuck) Bresnahan
400 Livestock Exchange Bldg.
DENVER
Phone KE 6318

HELP WANTED

RESEARCH Engineer — 26-40 — B.S., and preferably an advanced degree in petroleum or mechanical engineering. Must be widely experienced in well completion practices. Will be responsible for research program in well completion practices and well mechanics. Salary open. Location — Ponca City, Oklahoma. State age, experience, education, and salary desired in opening letter. Write direct to Personnel Records Division, Continental Oil Company, Ponca City, Oklahoma.

WANTED an experienced geologist who can find oil for an independent oil company operating in the Gulf Coast Area. Box E-495, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPANDING program provides excellent opportunity for a few experienced Seismic Party Chiefs for foreign and Canadian assignments. Applicants should have not less than three years' experience in capacity of Party Chief, be proficient in interpretation, and have proven ability to administer crew. Liberal compensation based upon competence. United Geophysical Company, Inc., Bin M, Pasadena 15, California.

GEOLOGISTS with masters degrees having 3 years or under experience. Petroleum Engineers with 1½ or more years well work experience. Experimental geophysicists under 40. Experienced landmen with law degrees under 35. Topographical draftsman. Excellent employer. Good salaries. Experienced oilwell supply storemen, store managers and salesmen. No fees. Tom Robinson, owner Oil Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974.

DESIGNERS WANTED
in our
LOS ANGELES OFFICES

For layout and detailed drafting in Piping, Electrical, Pressure Vessel, Instrumentation, and Flow Sheet work. Send complete resume of education and experience to:

The Fluor Corporation, Ltd.
P.O. Box 7030, East Los Angeles 22, Calif.

HELP WANTED

ENGINEER—Machine Design of Oil Field Equipment for 25-year-old company. Excellent pay and liberal employee benefits. Write or interview at plant. Cardwell Mfg. Co., Inc., 819 South Wichita Street, Wichita, Kansas.

KEY Seismograph Personnel Needed by Established and Expanding Seismograph Company. Box E-264, The Oil and Gas Journal, Tulsa, Oklahoma.

INTERNAL Auditor for integrated oil company in Mid-Continent Area. Excellent future. Age limit to 45. Public accounting and oil experience desired. Our employes know of this ad. Box E-473, The Oil and Gas Journal, Tulsa, Oklahoma.

REPRESENTATIVE TO SELL A VOLUME LINE OF STAPLE ARTICLES OF STEEL AND BRASS WITH CONTINUOUS REPEATS. DIRECT TO R.R., UTILITIES, O.E.M. etc. STATE LINE, TYPE TRADE AND TERRITORY. BOX E-487, THE OIL AND GAS JOURNAL, TULSA, OKLA.

GEOLOGIST

An established Canadian company seeks the services of a geologist between the ages of 30 and 40 with practical field experience to supervise operations in the Caribbean area. Please address replies, which will be treated in confidence, to

Fred Gee,
Temple Building,
62 Richmond Street W.,
Toronto, Ontario.

WANTED
REFINERY ENGINEERS

Employment opportunities now available for qualified graduate engineers with an American oil company in South America.

DESIGNERS
Structural, Electrical, and Piping

Five to eight years' experience necessary to qualify. Will be required to draft, design, and check oil refinery installations. Will make field investigations and determine economical practices as well as make recommendations for repairs.

MAINTENANCE ENGINEERS

Two to six years' experience in maintenance and construction division of a refinery or equivalent experience in refinery construction required. Will work in planning, scheduling, and coordination of maintenance and construction.

EQUIPMENT INSPECTORS

Two to five years' oil refinery process equipment inspection experience required. Will arrange and conduct inspections, request equipment renewals due to corrosion, failure, or defectiveness in conformance with accepted safety codes. Will conduct tests of equipment, study causes and prevention of corrosion and failure of metals.

Write giving complete address, age, marital status, and complete details of previous experience. Your reply will be held in strict confidence.

Box 308-M
Radio City Station
New York 19, New York

HELP WANTED

WANTED BY SEISMOGRAPH COMPANY
IMMEDIATE EMPLOYMENT
ATTRACTIVE SALARIES
Openings for Party Chief capable of interpretation of seismic data, Computers, Surveyors, Observers, and Shooters. Box E-449, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Cable tool drillers with big hole experience, who are sober and reliable. We offer permanent jobs with good pay. Layne-Minnesota Co., 3140 Snelling Ave., Minneapolis, Minn. Telephone—Parker 6668.

EXPERIENCED petroleum refinery process engineer with good prior training in both process engineering and plant operation. If you have satisfactory training and experience the position is in line for top job in a Mid-Continent refinery. Box E-488, The Oil and Gas Journal, Tulsa, Oklahoma.

PARTY CHIEF—Wanted by Independent Seismograph Company. Salary above average. Applicants should have not more than five years' experience. Box E-494, The Oil and Gas Journal, Tulsa, Okla.

RESEARCH Group Leader and Research Engineer — 26-40 — B.S., and preferably a Ph.D. in physical chemistry, physics, petroleum engineering, or chemical engineering. Should have experience in reservoir engineering, reservoir mechanics research, or fluid flow research. Will be responsible for research program in multiphase flow and other aspects of reservoir mechanics. Salary open. Location—Ponca City, Oklahoma. State age, experience, education, and salary desired in opening letter. Write direct to Personnel Records Division, Continental Oil Company, Ponca City, Oklahoma.

HELP WANTED

GRADUATE Petroleum Engineer one to three years experience in field and office duties for expanding independent producing company. Successful applicant will headquarter in Houston, but must be free to travel. Excellent opportunity for hard worker. In answer give age, education, experience in detail, marital and draft status and starting salary expected. Box E-461, The Oil and Gas Journal, Tulsa, Oklahoma.

RESEARCH Metallurgist—26-40—B.S., and preferably advanced degree in metallurgy or metallurgical engineering. Should have experience with all types of laboratory apparatus for metallurgical study and experience in selecting materials for all types of services. Corrosion studies, materials selection, and anlysis of failures will constitute the bulk of the work. Salary open. Location—Ponca City, Oklahoma. State age, experience, education, and salary desired in opening letter. Write direct to Personnel Records Division, Continental Oil Company, Ponca City, Oklahoma.

WANTED—TRAVELING AUDITOR
Excellent opportunity for auditor who is free to travel. Work requires auditing of oil company records in the United States and Canada. Applicant should be familiar with refinery procedures. Yield clerk and typing experience helpful. Must have automobile. Box E-469, The Oil and Gas Journal, Tulsa, Oklahoma.

PERSONNEL ASSITANT
Age 25 to 30. Degree. Major in Personnel Administration preferred. One to two years experience in wage and salary administration. Real opportunity. Mid-Continent area. Company will pay moving expenses. Write Box E-489, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

WANTED: Experienced refinery Superintendent for 4000 bbl. plant. Send experience record, salary expected and other details. Box E-459, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

GRADUATE Electrical Engineer—Eleven (11) years experience with major electrical manufacturer applying electrical and mechanical equipment, pipelines, refineries and production. Previous distribution and maintenance. Basic knowledge micro-wave and geophysics. Private pilot. Age 37. Family. Desire connection with oil industry administrative engineering capacity. Box E-467, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

PETROLEUM Engineering graduate of Texas A. & M. with seven years field, engineering, and management experience in drilling and production on the Gulf Coast. Box E-478, The Oil and Gas Journal, Tulsa, Oklahoma.

SURVEYOR, with 10 years experience in pipeline construction and location, general oil field surveying and land surveys both foreign and domestic with complete knowledge all types surveying instruments, desires position either domestic or foreign. Knows Spanish. Box E-476, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL SCOUT and Land man desires change. Knows Rocky Mountain Region in general and exceptionally well informed on Wyoming in particular. Box E-477, The Oil and Gas Journal, Tulsa, Oklahoma.

LEADING rust preventive and specialty lubricant formulator, desires position of chemical director with independent oil company. Age 45. Box E-475, The Oil and Gas Journal, Tulsa, Oklahoma.

STATISTICIAN—6 years utility rate work, cost estimates, FPC cases, capacity allocations, economic studies. 2 years design calculations. 1 year steam diesel operation. BS Mech. Eng. Age 32. Box E-485, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL SECRETARY: Thoroughly experienced in all executive phases of oil production, exploration, land and accounting. Presently employed. Desires connection with small independent in Dallas. Can furnish excellent background and references upon request. Single, 35 years old. Please reply to Box E-480, The Oil and Gas Journal, Tulsa, Oklahoma.

FORMER Independent Oil Operator ten years, with legal education, plus eight years Wall Street experience, desires connection raise funds exploratory well drilling from excess profits taxpayers. Box E-396, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER AVAILABLE
BSChE 1949 (cum laude), EE minor, 3 years USNR, age 26, personable, presently employed as process engineer, one year polymer development, one year petroleum process engineering, has inquiring and original type of mentality, proven creative ability. Has originated and developed to plant scale valuable petroleum process yielding over $300,000 per month—payout time of half year. Now developing another original and patentable process for same firm. Present salary does not reflect ability or results. Desire change due to lack of financial incentive. Desire foreign position (tax benefits) or opportunity for minor share of creative results. Wide field of interests. Available for interview late December. Box E-474, The Oil and Gas Journal, Tulsa, Okla.

INSTRUMENT MAN, 9 yrs. experience in Refinery construction and maintenance. T. R. Hofius, 1303 N. Richardson, Roswell, New Mexico. Phone 2889 W.

EXPERIENCED public relations man, 40, resigning from major oil company. Consider full time PR job in Southwest; or being PR agent and/or house organ special writer in Southwestern States (Houston headquarters) for about four companies, monthly fee. Box E-499, The Oil and Gas Journal, Tulsa, Okla.

CAREER OPPORTUNITY FOR

PIPING DESIGNERS

Work in Southern California

Positions are open in the engineering and design of complete oil-refineries and chemical-plants. Our expanding workload presents opportunities for advancement.

Prefer mechanical engineers with experience in the design and drafting of high-pressure piping.

Please send a detailed summary of your education, experience, and personal history to our Personnel Department. Also include a recent photo of yourself. All replies will be kept confidential.

C F BRAUN & CO

Engineers Fabricators Constructors Consultants

1000 South Fremont Avenue, Alhambra, California

SITUATIONS WANTED

PATENT LAWYER: To establish corporation patent department. Five years petroleum patent law. Present salary in excess of $7,500. Box E-492, The Oil and Gas Journal, Tulsa, Oklahoma.

AIRLINE CAPTAIN—Age 32; selling experience; desires flying sales job, Houston area. Box E-498, The Oil and Gas Journal, Tulsa, Oklahoma.

ROYALTIES

WE will buy producing or non-producing oil royalties. Standard Security Company, 115 Broadway, New York 6.

MONTANA ROYALTIES
Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225 Great Falls, Montana.

LEASE AND DRILLING BLOCKS

OPERATOR with portable drilling rig, trucks, and other lease equipment, desires connections with financed parties, contemplating water flooding. Prefer shallow area Oklahoma, and Kansas; also have several leases suitable for flooding. Box E-484, The Oil and Gas Journal, Tulsa, Oklahoma.

READ Tulsa Oil and Gas Journal Oct. 18, pages 72 & 181, Imperial County, California, 5 year leases (rental paid 3 yrs.) on Geological-Geophysical structures. $200 per 40 acres. Write Main P.O. Box 30, Los Angeles.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

IF INTERESTED in reasonably priced oil and gas leases in Shelby County, Texas, surrounded by major company activity, write me for detailed information. C. A. Parker, Office Polley Hotel, Center, Texas.

WE want a good drilling block, some production with proven or semiproven acreage to be drilled preferred, from owner principals. Must be good properties. Texas properties will be given first consideration. Box E-460, The Oil and Gas Journal, Tulsa, Okla.

WILL checkerboard 10,000 acres for test well to 4,000 feet in Southwest New Mexico. Excellent Geology, Large Oil Company has leased all remaining acreage, a real hot spot of the future. Box E-464, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Oil and Gas Leases adjoining producing leases, also wildcat leases, drilling propositions and small producing properties; all in shallow territory. W. P. Harley, Bowling Green, Ky.

HAVE leases covering some 200 acres of 1200-1300 foot Bartlesville sand production in Washington County, Oklahoma, to farmout for waterflood. Pilot flood can be prosecuted on this property for approximate cost of a medium depth field well. Excellent results have been obtained in this County. There are three floods presently being successfully conducted in the field in which this property is located. Box E-491, The Oil and Gas Journal, Tulsa, Oklahoma.

500-ACRE BLOCK: Carter County, Oklahoma, ready for shallow wildcat test this year. Box E-489, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLING BLOCK—FOR SALE

About 10,000 acres in leases on semi-proven structure owned by responsible operator in San Juan Basin Area. Full information upon request. Box E-490, The Oil and Gas Journal.

LEASES ROYALTIES
Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

LEASE AND DRILLING BLOCKS

OFFER attractive shallow wildcat drilling deal. W. H. Mahon, P.O. Box 821, Brownwood, Texas.

INTERESTED in 14,000 acre spread S.E. Fannin County, Texas, for Paleozoic test? Mostly pooling leases. Write at once. Box E-496, The Oil and Gas Journal, Tulsa, Oklahoma.

IF you are interested in Williston basin of South Dakota write me. Minerals, leases, drilling blocks, royalties or over-rides also represent you at State School Land auctions. John F. Schoof, Gettysburg, S. D.

2200 ACRES in Tensas Parish. Good oil prospects, fine soil, pasture and timber. Priced with or without minerals. Mrs. Arno Halbfass, Shreveport, Louisiana.

FOR SALE: Oil and Gas Leases, Royalties and drilling blocks in Kentucky. Write Harvey Daugherty, White Run, Ky.

CAPITAL immediately available for geologically attractive Drilling deals and oil producing properties. Send full particulars. Box E-434, The Oil and Gas Journal, Tulsa, Oklahoma.

EQUIPMENT MEN

(Continued from page 163)

trict radioactivity engineer at New Iberia, La., holding that position until his recent move to Houston.

Dallas Office Established By Merritt-Chapman & Scott

J. B. ALLINSON

Merritt - Chapman & Scott Corp. recently announced the establishment of an office at Dallas to serve as headquarters for the 91-year-old company's construction activities in the Southwest and Gulf Coast areas.

The new company office will be headed by J. B. Allinson, whose appointment as M-C&S's regional representative in the Southwest was simultaneously announced by Ralph E. DeSimons, executive vice president and general manager of the company.

Before joining M-C&S, Allinson was until recently a vice president of Wyatt C. Hedrick, Inc., architects and engineers with offices at Dallas, Fort Worth, and Houston. Previously he served 4 years as Houston district manager for Refinery Maintenance Co. of Los Angeles, a company engaged in industrial and engineering-construction work.

In his post with Merritt-Chapman & Scott, Allinson will be representing a company active in virtually every field of construction.

Oil Base Appoints Rocky Mountain Distributor

Thad Randolph, vice president in charge of sales, Oil Base, Inc., Compton, Calif., has announced the appointment of English Oil Tool Co., Casper, Wyo., as the exclusive distributor for sales and service of Oil Base products for the Rocky Mountain area.

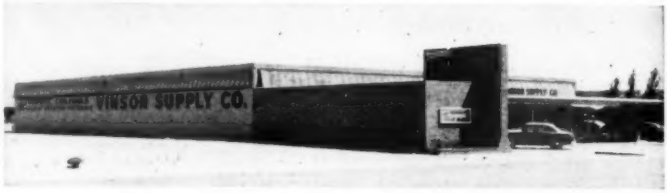
English Oil Tool is owned and operated by Glenn English. He is assisted by Don Rogers who is temporarily in Compton where he is undergoing complete training at Oil Base on the use and maintenance of oil-base drilling fluids, oil-emulsion muds, and additives.

Girdler Corp. Names Beck Eastern District Manager

Ellis T. Beck is the new Eastern district manager of the Votator division of Girdler Corp., Louisville, Ky., succeeding Samuel Welch, recently resigned.

Beck joined the Votator division in 1948. Prior to his assignment to the

Vinson Supply Moves Into New Odessa Headquarters



New Vinson Supply Co. offices and warehouse at Odessa, Tex.

Vinson Supply Co. recently moved into its new offices and warehouse in Odessa, Tex., which occupies 20,000 sq. ft. and has an additional 20,000 sq. ft. of storage yard available.

This new warehouse, which specializes in pipe, valves, fittings, and controls, is located on a rail spur to handle carload shipments. The new enlarged facilities enable Vinson to carry the Permian basin's most complete stocks of Fisher controls, Nordstrom valves, Crane valves, Ladish welding fittings and flanges, and National pipe.

B. E. Keeling, vice president, is in charge of Vinson's West Texas operations. Other Vinson Supply stores are in Dallas and Snyder, Tex., with home offices in Tulsa.

East he was a sales engineer in the fats and oils section, and has had wide experience in process and project engineering.

The Votator division manufactures heat-transfer equipment and auxiliary equipment for the continuous processing of a long list of liquid and viscous materials.

Central Area

(Continued from page 156)

at the rate of 11 bbl. of oil per hour. Testing Rosiclare lime, opposite which casing is perforated at 3,083-89 ft., it swabbed and flowed 21 bbl. per hour. Total depth is 3,204 ft., with bottom of casing at 3,180 ft. Location is 3 miles from other production.

ILLINOIS SUCCESSFUL WILDCATS

Clinton County: Paul Schoendienst 1 Branch, NW NW SW 11-1n-3w, IP 25 bbl., Cypress 1,076-81 ft., TD 1,081 ft.

Effingham County: C. J. Simpson 1 Davis, SW SW SW 23-6n-5e, IP 150 bbl., Rosiclare 2,454-62 ft. and McClosky 2,470-78 ft., TD 2,490 ft.

Jasper County: Bell Brothers 1 Rudd, NE NW NE 2-5n-10e, IP 228 bbl., McClosky 2,847-51 ft. and 2,853-61 ft., TD 2,869 ft.

Wayne County: Goodman Oil Co. 1 Baker, NW NE NW 20-2s-9e, IP 10 bbl., Aux Vases 3,274-3,300 ft., TD 3,432 ft.

ILLINOIS WILDCAT FAILURES

Christian County: S. C. Yingling, SW SW SE 4-14n-1w, dry, TD 2,103 ft.

Clinton County: Continental Oil Co. 1 Schwierjohn, NE NE NE 5-1n-4w, dry, TD 2,562 ft.

E. J. Goldschmidt 1 Warnecke, NW NW SW 17-2n-3w, dry, TD 3,356 ft.

Edwards County: G. C. Schoonmaker 1 Bunting, NE NW SW 32-1s-10e, dry, TD 3,469 ft.

Ralph C. Halbert 1 Cowling, NW SW SE 17-2s-14w, dry, TD 3,120 ft.

Jasper County: Calvert Drilling, Inc., 1 Miller, SW SW SW 23-5n-10e, dry, TD 3,025 ft.

Jefferson County: Perrine & Perrine 1 Sledge, SW NW NE 30-1s-4e, dry, TD 2,700 ft.

Marion County: Keystone Oil Co. 1 Wesner, N½ SE SW NW 24-2n-1e, dry, TD 2,195 ft.

Perry County: Peak Drilling Co. 1 Pyramid, SW SW NW 10-6s-3w, dry, TD 3,075 ft.

Richland County: Calvert Drilling, Inc., 1 Simpson, SW NE NE 25-2n-10e, dry, TD 3,385 ft.

Washington County: Dale Hopkins 1 Kashuba, SE NE NE 3-3s-2w, dry, TD 1,589 ft.

White County: D. H. Bolin 1 Buss, SW NW SE 28-5s-8e, dry, TD 3,492 ft.

INDIANA

Cline & Lambert have opened a new pay zone for the newly discovered Iona producing area in southwestern Knox County. Their 1 Roy Pea, Military Donation 41-2n-10w, pumped 10 bbl. per day from Aux Vases lime at 1,711-16 ft. Location is northwest of the town of Iona and southwest of the area's discovery well, A. J. Slagter 1 Deem, Survey 36-2n-10n, (listed below), completed in Benoist sand at 1,682-90 ft.

INDIANA SUCCESSFUL WILDCATS

Gibson County: Cline & Lambert 1 Annis, SE SE SE 8-3s-9w, IP 2,500,000 cu. ft. gas, Cypress 1,638-42 ft., TD 1,864 ft. (discovery well Mackey West pool).

Knox County: A. J. Slagter 1 Deem, Sur. 36-2n-10w, IP 2 bbl., Benoist sand 1,682-90 ft., TD 1,861 ft. (discovery well Iona pool).

INDIANA WILDCAT FAILURES

Clay County: H. H. Weinert 1 Graber, NE NE NW 30-9n-6w, dry, TD 1,846 ft.

Jasper County: J. L. Cowan 1 Schultz, CNL SW SW SW 22-31n-5w, dry, TD 980 ft.

Knox County: C. E. Nickens 1 Hocking, NE SE SE 19-1n-10w, dry, TD 1,918 ft.

Nation Oil Co. 1 Warner, Military Donation 82-3n-8w, dry, TD 1,500 ft.

Cline & Lambert 1 Conner, Military Donation 50-3n-9w, dry, TD 1,687 ft.

Posey County: Paul Rossi 1 Kueber, SW NE SE 2-7s-13w, dry, TD 2,841 ft.

Sullivan County: Barnes Oil Co. 1 Nowlin, NE NE NW 30-8n-8w, dry, TD 909 ft.

Vanderburgh County: Ralph Halbert 1 Elpers, NE NW SE 20-4s-11w, dry, TD 2,245 ft.

ADVERTISERS

Aerofin Corporation 137
Allis-Chalmers Mfg. Co. 42
Allis Co., The Louis 38
Altens Foundry & Machine Works 144
American Iron & Machine Works Co. Back Cover
American Steel & Wire Co. 52
Baird Mfg. Co. 147
Baker Oil Tools, Inc. 64
Barret, Inc., William M. 151
Beryllium Corporation, The 133
Bethlehem Supply Co. 1
Bokum Tool Co. 142
Brown & Root, Inc. 2
Bucyrus-Erie Co. 30
Byron Jackson Co. 23, 142
Cable & Staples 151
Cameron Iron Works, Inc. 59, 147
Charlie's Machine Works 135
Chase Brass & Copper Co. 48
Chicago & Southern Air Lines 137
Chicago Metal Hose Corporation 35
Cities Service Oil Co. 130
Clark Bros. Co., Inc. 32, 33
Classified Advertising 164, 165, 166, 167, 168
Cleveland Trencher Company, The 128
Climax Engine and Pump Mfg. Co. 137
Coffing Hoist Company 148
Cooling Tower Erection & Repair Service 130
Colorado Fuel and Iron Corp., Wickwire Spencer Steel Division 54
Cooper-Bessemer Corp., The 93
Coppus Engineering Corp. 3
Crane Co. 7
Crose Manufacturing Co., Inc., M. J. 129
Darling Valve and Mfg. Co. 149
Dean Brothers Pumps, Inc. 133
Dowell Incorporated 126
Dresser Industries, Inc. 81
Drilling & Service, Inc. 155
Edward Valves, Inc. 56, 57
Electrofilm Corp. 133
Elliott Company 28, 29
Empire Trust Company 141
Ensign Carburetor Company 15
Fairbanks, Morse & Co. 130
Filtrol Corporation 118
Fluid Packed Pump Company 95, 96
Fort Worth Steel and Machinery Co. 143
Foxboro Company, The 10, 11
Frontier Chemical Company 154
Gaso Pump & Burner Mfg. Co. 14
General Electric Company 40
General Geophysical Company 138
Goodall Rubber Company 120
Goodrich Chemical Company, B. F. (Hycar) 85
Grancell, I. H. 135
Grinnell Company, Inc. 13
Grove Regulator Co. 6
Guiberson Corporation 113
Gulf Oil Corporation 22
Gunite Concrete & Construction Co. 132
Halliburton Oil Well Cementing Co. Inside Front Cover
Haynes Stellite Company, A Division of Union Carbide and Carbon Corporation 49
Hazard Wire Rope Division of American Chain & Cable Co., Inc. Inside Back Cover
Houston Contracting Company 128
Hughes Tool Co. Front Cover
Inferno Co., The 127, 132
Jones & Laughlin Steel Corp. 41
Jones & Laughlin Supply Co. 31
Kaiser Steel Corporation 21
Keasbey & Mattison 45
Kidde & Company, Inc., Walter 51
Kieley & Mueller, Inc. 43
Kinsbach Tool Co., Inc. 147
Lane-Wells Company 80
Larkin Packer Company, Inc. 134
Lone Star Cement Corporation 62
Lunkenheimer Co., The 28
Magnet Cove Barium Corp. 54
Marman Products Co., Inc. 157
Martin-Decker Corp. 145
Mayo Hotel, The 128
McCord Corporation 132
McDonald Co., B. F. 131
Middle West Coating & Supply 157
Minneapolis-Moline 142
Mission Mfg. Company 153
Moore Corporation, Lee C. 115
Murphy Diesel Company 9
Mutual Chemical Company of America 150
National Airoil Burner Co., The 132
National Supply Co., The 17, 18, 19, 20
National Tank Company 170
Nicolet Industries, Inc. 157
Norris Brothers, Inc. 59
Oil Center Tool Co. 44
Oil Well Supply Co. 4
Onan & Sons, Inc., D. W. 109
Paris Distributor, Inc., Henry H. 136
Parkersburg Rig & Reel Co. 99
Peerless Pump Division of Food Machinery & Chemical Corporation 27
Penn Electric Switch Co. 146
Perrault Brothers 127, 151
Petroleum Distributing Co. 148
Petroleum Electric Power Association 47
Powell Co., The Wm. 16
Reed Roller Bit Company 116
Refinery Supply Co., The 8
Republic Steel Corporation 37
Ryerson & Son, Inc., Joseph T. 152
Schlumberger Well Surveying Corp. 53
Security Engineering Co., Inc. 61
Southern Mill & Mfg. Co. 140
Southwestern Core Labs. 151
Spang-Chalfant Division of The National Supply Co. 18, 19
Spicer Mfg., Div. of Dana Corp. 12
Standco Brake Lining Co. 136
Taylor Instrument Companies 24, 25
Thomas Flexible Coupling Co. 156
Thornhill-Craver Co. 36
Timken Roller Bearing Company 50
Trackson Company 5
Ultra Violet Products, Inc. 128
Union Carbide and Carbon Corporation, Haynes Stellite Company 49
U. S. Steel Corp. Subsidiaries 52
United Supply & Manufacturing Co. 123
Wait Mfg. Co. 136
Wallace & Tiernan Products, Inc. 59
Walworth Co. 55
Warner Lewis Company 128
Wickwire Spencer Steel Division, Colorado Fuel and Iron Corp. 54
Willson Products, Inc. 58
Wolverine Tube Division Calumet & Hecla Consolidated Copper Company 39
Wood's Sons Co., T. B. 132
Worthington Pump & Machinery Corp., Centrifugal Pump Division 48
Youngstown Sheet and Tube Company 79

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that the E½SE¼ sec. 15, T. 17 S., R. 32 E., N.M.P.M., New Mexico, 80 acres, within the known geologic structure of the Maljamar field, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1 p.m., Eastern Standard Time, January 2, 1952, when bids will be opened. The details of the lease offering and how and where to file bids may be obtained by addressing an inquiry to the Manager of the Land and Survey Office, Santa Fe, New Mexico, or to this office. Marion Clawson, Director.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that 319.69 acres in T. 46 N., R. 96 W., 6th P.M., Wyoming, within the known geologic structure of the Grass Creek field will be offered in three parcels for oil and gas leasing, through competitive bidding to the qualified bidder of the highest cash amount per acre, at 1 p.m., Eastern Standard time, January 2, 1952, when bids will be opened. The details of the lease offering, how and where to file bids, and a description of the lands may be obtained by addressing an inquiry to the Manager of the Land and Survey Office, Cheyenne, Wyoming, or to this office. Marion Clawson, Director.

TABLE OF CONTENTS ON PAGE 63

As the Oil and Gas Industry Goes . . . So Goes NATIONAL TANK!

Contrasted with one small office and plant in 1926, the National Tank Company today has many offices, stock points and service centers to meet the ever-growing demand for National products. Included is the National Supply Export Corp. which handles world-wide foreign distribution of National products. Wherever your operations in the oil producing world, you can count on National for expedient, dependable handling of your needs.

It's a National

NATIONAL TANK COMPANY

TULSA, OKLAHOMA

BRANDS *are important!*

Cattle are branded primarily to prove ownership.
But, experienced cattlemen and livestock buyers know that
some brands are always found on higher quality animals.
These brands come from better feed and water,
from better breeding stock, from better handling.
The HAZARD brand on a reel of wire rope is your assurance of quality—
quality backed by wire rope manufacturing experience
dating back to 1845. Next time specify HAZARD.
Remember— ***"Brands are important!"***

ACCO *Be Business for Your Safety*

AMERICAN CHAIN & CABLE
HAZARD WIRE ROPE DIVISION

TRADE MARK

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, Odessa, Tex., Pittsburgh, San Francisco, Bridgeport, Conn.

In many areas-

a key to GREATER PROFITS!

AMERICAN IRON

Flash Welded

TOOL JOINTS

In many areas — a flash welded, unitized drill string provides advantages that make for greater profits! In these areas, you'll find that American Iron "Flash Welded" Tool Joints provide the key to the most effective, economical performance from this type drill string!

Three important factors make American Iron "Flash Welded" Tool Joints outstandingly dependable. They're DESIGNED RIGHT . . . MADE RIGHT, . . . and INSTALLED RIGHT, with gigantic controlled surges of electricity welding tool joints to drill pipe — forming integral units!

Manufacturers of A.P.I., Straight Grip, Ameweld, and Tubing Tool Joints

AMERICAN IRON & MACHINE WORKS CO.

MANUFACTURERS OF A OIL FIELD EQUIPMENT

REG. U.S. PAT. OFF.

OKLAHOMA CITY U.S.A.

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION MEMBER